HP ProLiant BL45p Server Blade
User Guide

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Component identification

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Front panel LEDs
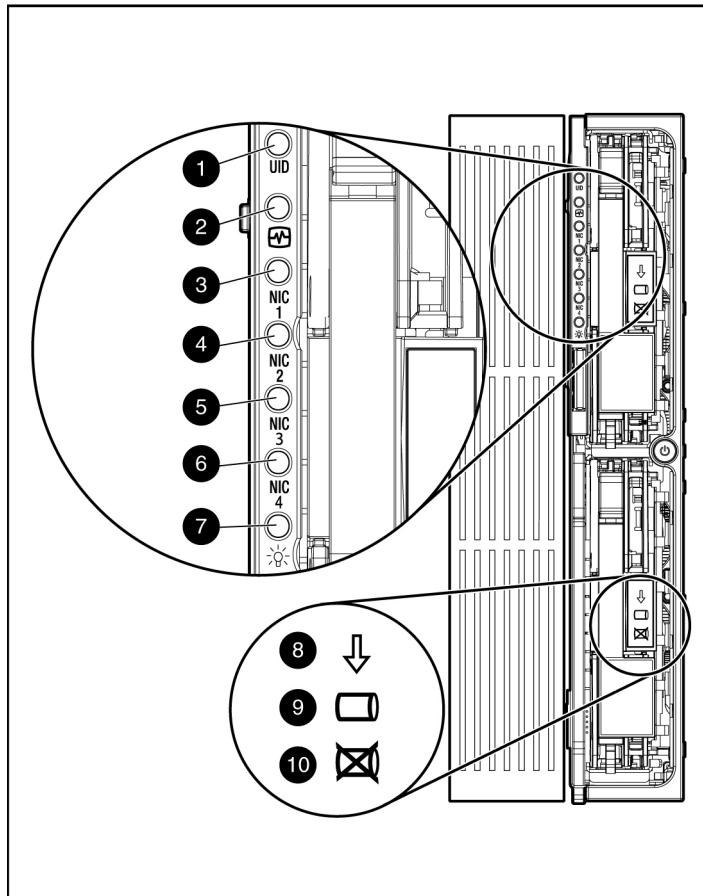
Item	Description	Status
1	UID LED	Blue = Identified
		Blue flashing = Active remote management
		Off = No active remote management

Item	Description	Status
2	Health LED	Green = Normal
		Green Flashing = Booting
		Amber = Degraded condition
		Red = Critical condition
3	NIC 1 LED*	Green = Network linked
		Green flashing = Network activity
		Off = No link or activity
4	NIC 2 LED*	Green = Network linked
		Green flashing = Network activity
		Off = No link or activity
5	NIC 3 LED*	Green = Network linked
		Green flashing = Network activity
		Off = No link or activity
6	NIC 4 LED*	Green = Network linked
		Green flashing = Network activity
		Off = No link or activity
7	Power On/Standby LED	Green = On
		Amber = Standby (auxiliary power available)
		Off = Off
8	Hard drive activity LED	Green/Flashing = Activity
		Off = No activity
9	Online status	Flashing = Online activity
		Off = No online activity
10	Fault status	Flashing = Fault process activity
		Off = No fault process activity

* Actual NIC numeration depends on several factors, including the operating system installed on the server blade.

Front panel components
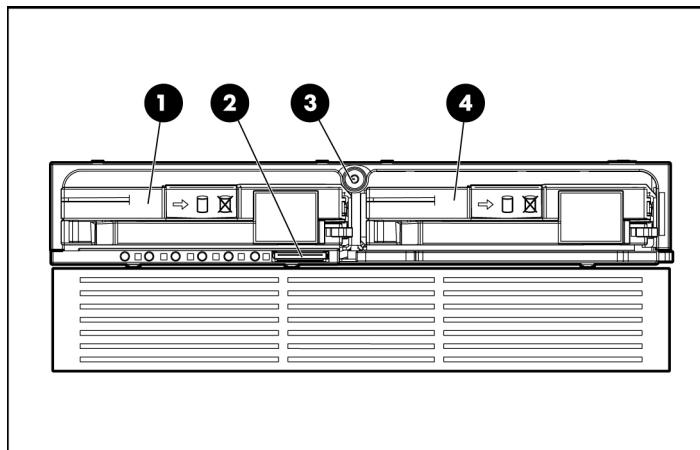
Item	Description
1	Hot-plug SCSI hard drive bay 1
2	I/O port*
3	Power On/Standby button
4	Hot-plug SCSI hard drive bay 2

* The I/O port is used with the local I/O cable to perform some server blade configuration and diagnostic procedures.

Hot-plug SCSI hard drive LED combinations

Activity LED (1)	Online LED (2)	Fault LED (3)	Interpretation
On, off, or flashing	On or off	Flashing	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
On, off, or flashing	On	Off	The drive is online and is configured as part of an array. If the array is configured for fault tolerance and all other drives in the array are online, and a predictive failure alert is received or a drive capacity upgrade is in progress, you may replace the drive online.

Activity LED (1)	Online LED (2)	Fault LED (3)	Interpretation
On or flashing	Flashing	Off	**Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.** The drive is rebuilding or undergoing capacity expansion.
On	Off	Off	**Do not remove the drive.** The drive is being accessed, but (1) it is not configured as part of an array; (2) it is a replacement drive and rebuild has not yet started; or (3) it is spinning up during the POST sequence.
Flashing	Flashing	Flashing	**Do not remove the drive. Removing a drive may cause data loss in non-fault-tolerant configurations.** Either (1) the drive is part of an array being selected by an array configuration utility; (2) Drive Identification has been selected in HP SIM; or (3) drive firmware is being updated.
Off	Off	On	The drive has failed and has been placed offline. You may replace the drive.
Off	Off	Off	Either (1) the drive is not configured as part of an array; (2) the drive is configured as part of an array, but it is a replacement drive that is not being accessed or being rebuilt yet; or (3) the drive is configured as an online spare. If the drive is connected to an array controller, you may replace the drive online.

Rear panel components
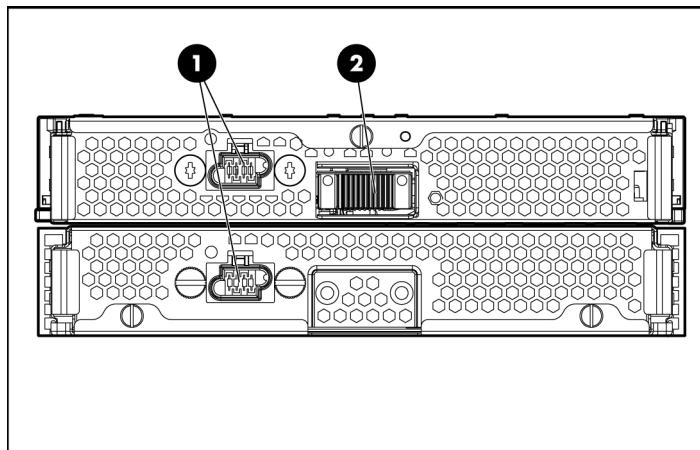
Item	Description
1	Power connectors
2	Signal connector

Internal components

Primary system board (processors 1 and 2) (on page)

Secondary system board (processors 3 and 4) (on page)

Primary system board (processors 1 and 2)
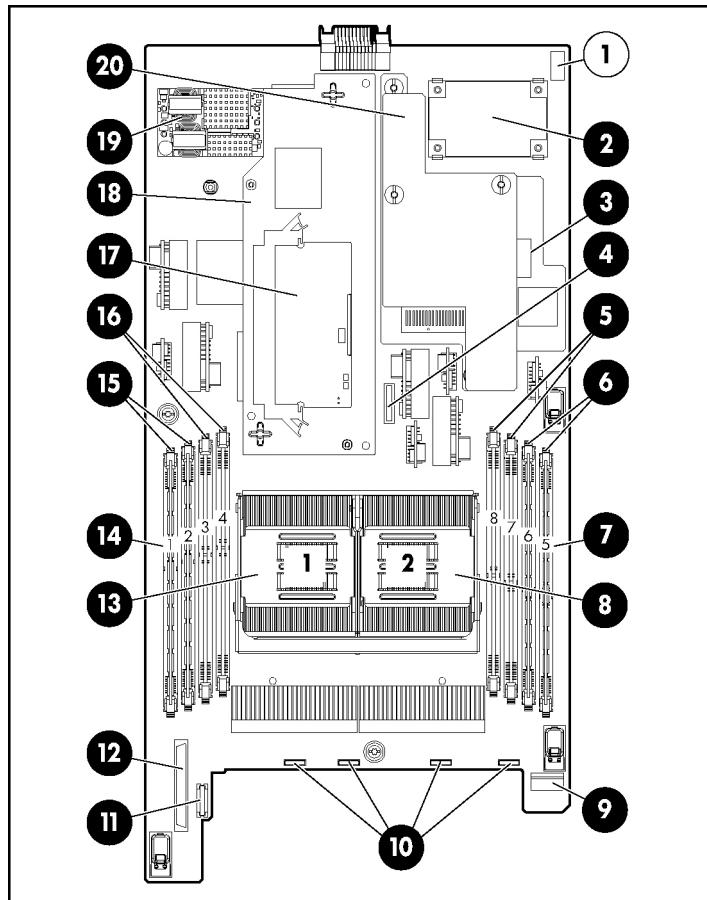
Item	Description
1	System maintenance switch (SW1)
2	DC filter module
3	Standard NIC mezzanine card
4	System battery
5	Processor 2 memory bank 2
6	Processor 2 memory bank 1 (shown populated)

Item	Description
7	DIMMs 5-8
8	Processor socket 2 (shown populated)
9	SCSI backplane board connector 2
10	Fan connectors
11	Power button/LED board connector
12	SCSI backplane board connector 1
13	Processor socket 1 (shown populated)
14	DIMMs 1-4
15	Processor 1 memory bank 1(shown populated)
16	Processor 1 memory bank 2
17	Smart Array 6i Battery-Backed Write Cache Enabler (optional)
18	Smart Array 6i Controller
19	Power converter modules
20	Fibre Channel Adapter (optional)

Secondary system board (processors 3 and 4)
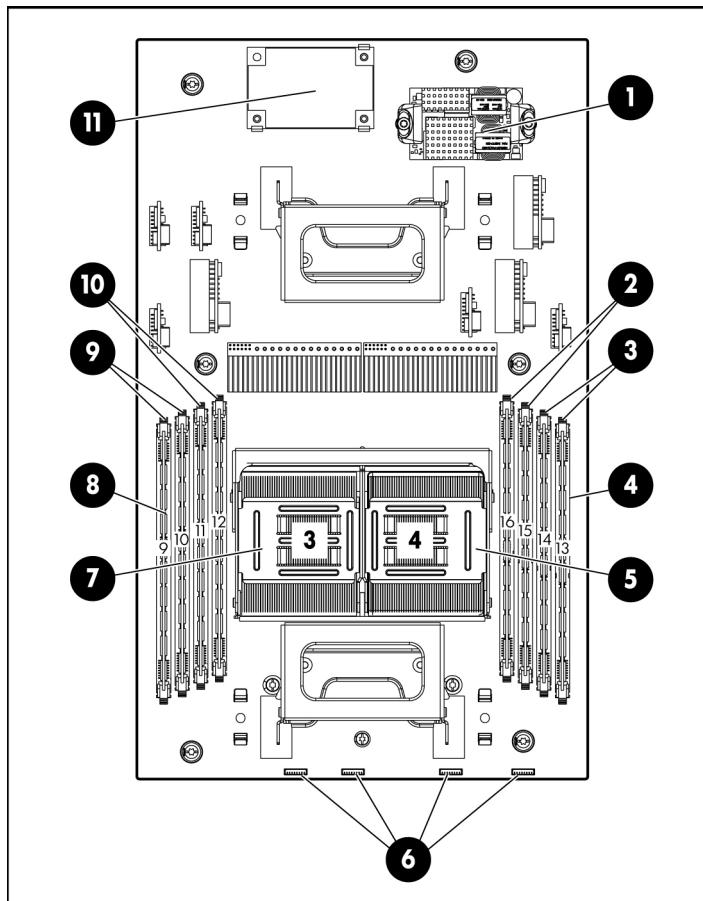
Item	Description
1	Power converter modules
2	Processor 4 memory bank 2
3	Processor 4 memory bank 1 (shown populated)
4	DIMMs 13-16
5	Processor socket 4 (shown populated)
6	Fan connectors

Item	Description
7	Processor socket 3 (shown populated)
8	DIMMs 9-12
9	Processor 3 memory bank 1(shown populated)
10	Processor 3 memory bank 2
11	DC filter module

System maintenance switch

Position	Function	Default
1*	iLO Security override	Off
2	Configuration lock	Off
3	Reserved	Off
4	Reserved	Off
5*	Password disabled	Off
6*	Reset configuration	Off
7	Reserved	Off
8	Reserved	Off

*To access redundant ROM, set S1, S5, and S6 to ON.

Local I/O cable
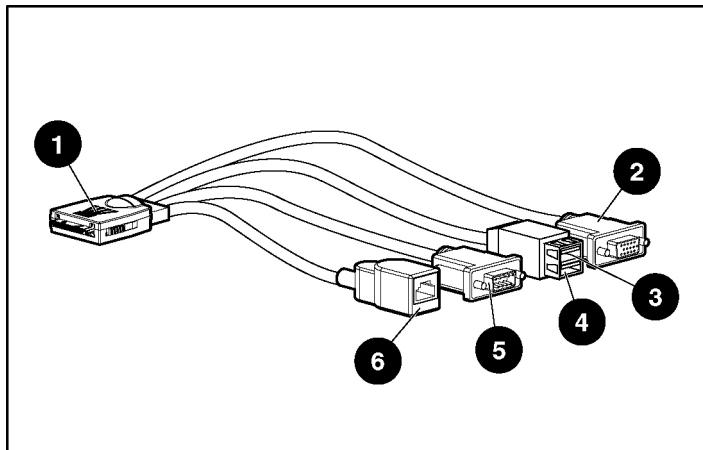
Item	Connector	Description
1	Local I/O	For connecting to the local I/O port on the server blade front panel
2	Video	For connecting a video monitor
3	USB 1	For connecting a USB device
4	USB 2	For connecting a USB device
5	Serial	For trained personnel to connect a null modem serial cable and perform advanced diagnostic procedures
6	iLO RJ-45 (10/100 Ethernet)	For connecting an Ethernet to the server blade iLO interface from a client device

Server blade enclosure bay numbering

Each server blade enclosure requires a pair of interconnect modules to provide network access for data transfer. Resolve bay numbering before determining connections between the server blades and interconnects.

> **IMPORTANT:** Note that server blade bay numbering in the figure is reversed when looking at the rear of the enclosure.
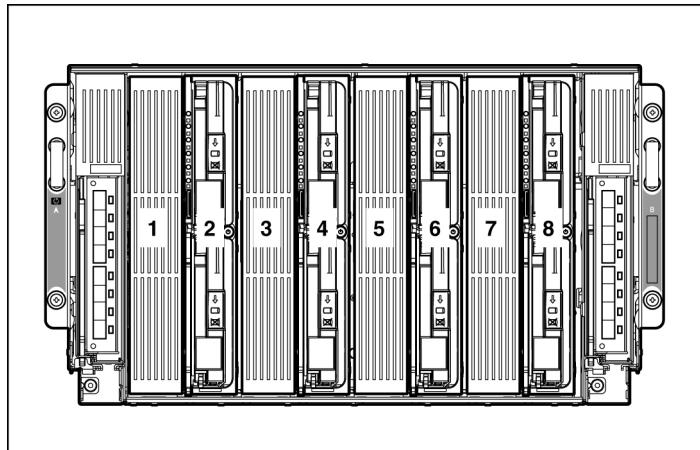
iLO connections

A single iLO connector resides on the server blade management module of the enhanced server blade enclosure. This RJ-45 connector enables remote manageability for each server blade in the enhanced server blade enclosure.
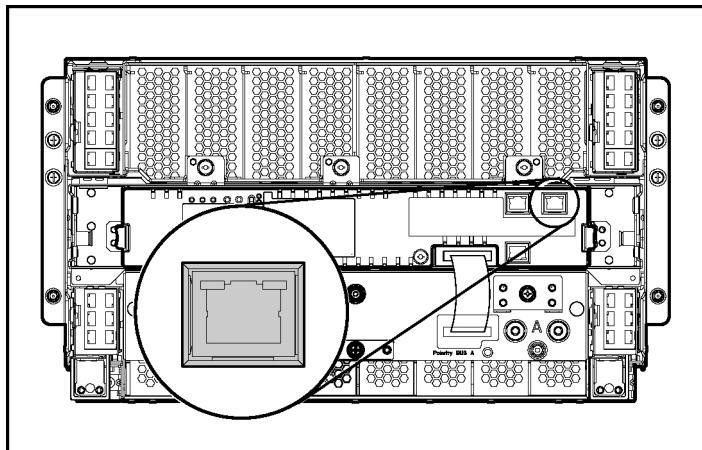
For more information about the enhanced server blade enclosure, refer to the *HP ProLiant BL p-Class Server Blade Enclosure Upgrade Installation Guide* or the *HP ProLiant BL p-Class Server Blade Enclosure Installation Guide*.

Server blade enclosure compatibility

The HP ProLiant BL45p Server Blade requires the support of an HP BladeSystem p-Class Server Blade Enclosure with enhanced backplane components (enhanced server blade enclosure). For more information on compatibility of enclosures, refer to the HP website (http://www.hp.com/go/bladesystem/enclosure/compatibility).

Operations

In this section

Power up the server blade

By default, the server blade is set to power up automatically when installed in the server blade enclosure. Be sure the server blade is compatible with the server blade enclosure. Refer to "Server Blade Enclosure Compatibility (on page 19)."

If the default setting is changed, use one of the following methods to power up the server blade:

- Power On/Standby button

  - A momentary press initiates a power-up request. The server blade determines power availability from the power subsystem. If required power is available, the server blade powers up.

  - A press of 5 seconds or more initiates a power-up override. The server blade powers up without power availability detection from the system.

    > **CAUTION:** Always observe RILOE alerts before initiating a power-up override to prevent a hot-plug power supply fault and possible loss of system power. For more information, refer to the *HP Integrated Lights-Out User Guide*.

    > **NOTE:** You can perform a server blade power-up override when the management modules are not in use to manage the power-up request. Be sure that sufficient power is available.

- Virtual power button features through iLO

  - A momentary power-up selection

  - A hold power-up selection

For more information about iLO, refer to "Configuration and Utilities (on page)."

Power down the server blade

Power down the server blade using either of the following methods:

- Press the Power On/Standby button on the server blade front panel.

  Be sure that the server blade is in standby mode by observing that the power LED is amber. This process may take 30 seconds, during which time some internal circuitry remains active.

- Use the virtual power button feature in iLO.

  After initiating a manual or virtual power down command, be sure that the server blade goes into standby mode by observing that the power LED is amber.

  > **IMPORTANT:** When the server blade is in standby mode, auxiliary power is still being provided. To remove all power from the server blade, remove the server blade from the server blade enclosure.

  > **IMPORTANT:** Remote power procedures require the most recent firmware for the power enclosure and server blade enclosure management modules. For the most recent firmware, refer to the HP website (http://www.hp.com/go/support).

Remove the server blade

1. Identify the proper server blade in the server blade enclosure.
2. Back up all server blade data.
3. Power down the server blade (on page).

4. Remove the server blade from the server blade enclosure.
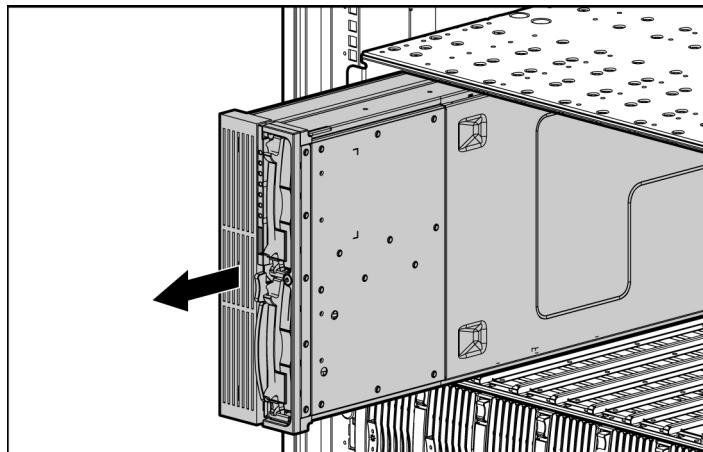
![Warning symbol] **WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.**

![Caution symbol] **CAUTION:** To prevent damage to electrical components, properly ground the server blade before beginning any installation procedure. Improper grounding can cause ESD.

Setup

In this section

Installing the HP BladeSystem components

Before performing any server blade-specific procedures, install the HP BladeSystem components in your environment. Refer to the hardware installation and configuration poster that ships with the server blade enclosure.

The most current documentation for server blades and other HP BladeSystem p-Class components is available at the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info).

Documentation is also available in the following locations:

- Documentation CD that ships with the server blade enclosure

- HP Business Support Center website (http://www.hp.com/support)

- HP Technical Documentation website (http://docs.hp.com)

Verifying system components

1. Verify that the proper server blade enclosure is installed for the server blade. Refer to "Server Blade Enclosure Compatibility (on page 19)."

2. Verify that adequate power is available. Refer to the HP BladeSystem p-Class power calculator on the HP website (http://www.hp.com/go/bladesystem/powercalculator).

Connecting to the network

To connect the HP BladeSystem to a network, each server blade enclosure must be configured with a pair of network interconnects to manage signals between the server blades and the external network. For more information about interconnect options, refer to the HP website (http://www.hp.com/go/bladesystem/interconnects).

For network cabling connections for the server blade, refer to the *HP ProLiant BL45p Server Blade Installation Instructions* that ship with the server blade.

Installing server blade options

Before installing and initializing the server blade, install any hardware options, such as an additional processor or hard drives. For server blade options installation information, refer to "Hardware Options Installation (on page 29)."

Installing a server blade

The HP ProLiant BL45p Server Blade occupies two bays in the server blade enclosure. Two blanks must be removed before the server blade can be installed.

1. Remove the server blade blank from the server blade enclosure.
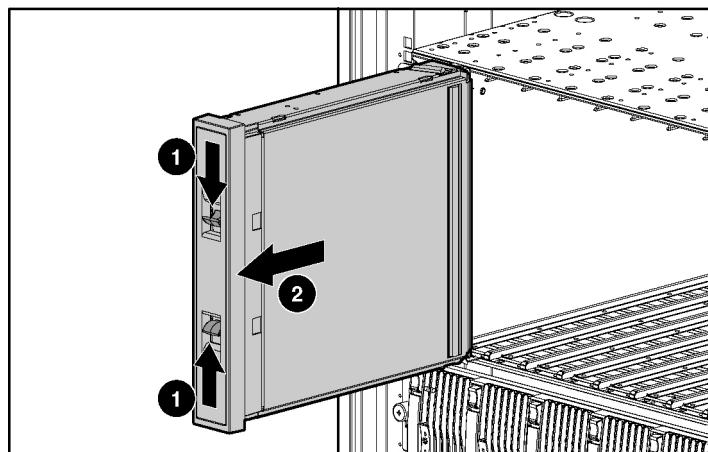
2. Repeat for the second server blade blank.

3. Install the server blade. When the server blade is fully inserted, it locks into place.
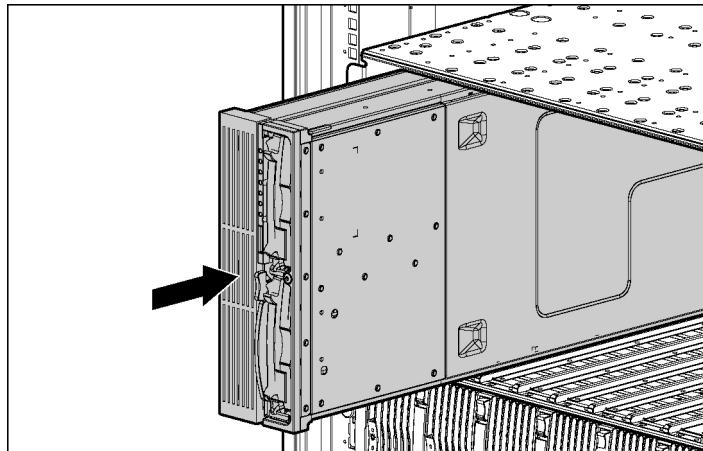
The default setting for server blades initiates automatic power up.

⚠ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the server blade enclosure unless all bays are populated with either a component or a blank.

NOTE: The first server blade must be installed into a server blade enclosure to facilitate naming the server blade enclosure, the rack, and the interconnects. Complete the system configuration before installing additional server blades.

Completing the configuration

To complete the server blade and HP BladeSystem configuration, refer to the hardware installation and configuration poster that ships with the server blade enclosure.

Hardware options installation

In this section

Processor option

Use these instructions to install an AMD Opteron™ processor into a supported HP ProLiant p-Class server blade.

> **NOTE:** Some server blade models ship with one processor installed. Use these instructions to install an optional second processor.

> ⚠ **WARNING:** **This documentation assumes that the server blade is in a server blade enclosure and not receiving power from a diagnostic station. If using a diagnostic station, be sure to disconnect the server blade from the diagnostic station before installing internal components.**

> ⚠ **CAUTION:** ESD can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure.

Processor installation guidelines

Observe the following processor installation guidelines:

- Always populate processor socket 1 with a processor. If processor socket 1 is empty, the server blade does not boot.

- Always populate processor socket 2 with a processor or a 1P enabler board and a processor blank. If processor socket 2 is empty, the server blade does not boot.

- The server blade supports configurations with one, two, or four processors. This server blade does not support a 3P configuration.

- Always use AMD Opteron™ 800 Series processors purchased from HP.

Removing a processor blank and 1P enabler board

To install the component:

1. Back up all data on the hard drive.

2. Power down the server blade (on page).

⚠ **WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.**

3. Remove the access panel.

4. Remove the processor blank and 1P enabler board.

Processor installation

To install the component:

1. Back up all data on the hard drive.

2. Power down the server blade (on page 22).

   ⚠ **WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.**

3. Remove the access panel.

4. Remove the processor blank and 1P enabler board, if necessary ("Removing a processor blank and 1P enabler board" on page 30).

   △ **CAUTION:** Always install a processor or 1P enabler board in processor socket 2. If processor socket 2 is empty, the server blade will not boot.

5. Install the processor.

   △ **CAUTION:** Be sure that the processor socket locking lever is open before installing the processor into the socket.

> ⚠ **CAUTION:** The processor is designed to fit one way into the socket. Use the alignment guides on the processor and socket to properly align the processor with the socket. Refer to the server blade hood label for specific instructions.
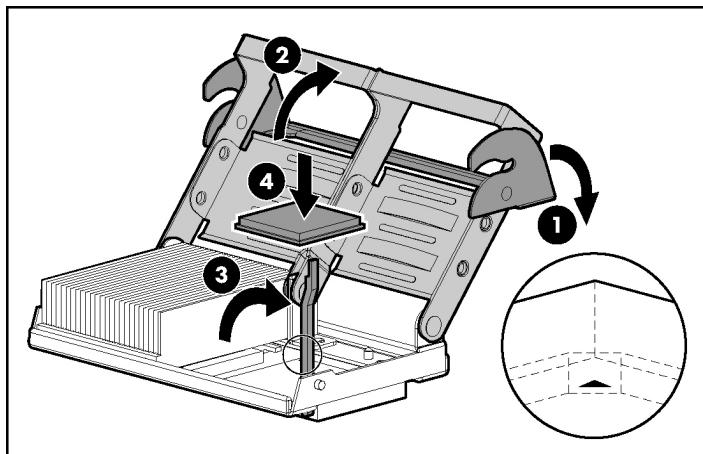
6. Close the processor socket locking lever.

> ⚠ **CAUTION:** Be sure that the processor socket locking lever is closed after the processor is installed. The lever should close without resistance. Forcing the lever closed can damage the processor and socket, requiring system board replacement.

7. Remove the protective cover from the thermal interface.
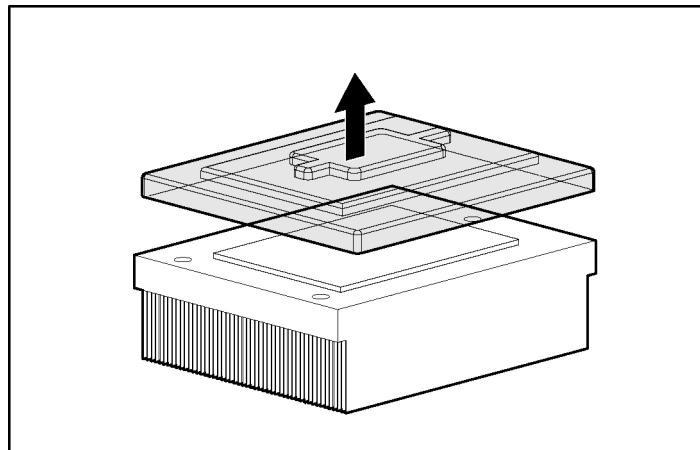
⚠ **CAUTION:** After the cover is removed, do not touch the thermal interface media.

IMPORTANT: The heatsink is not reusable and must be discarded if removed from the processor after application.

8. Insert the heatsink and close the processor cage. Closing the processor cage aligns the heatsink.
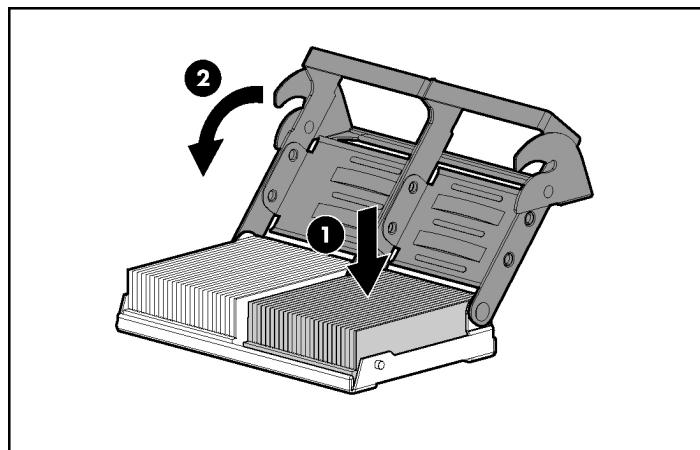
9. Close and secure the processor cage latch.
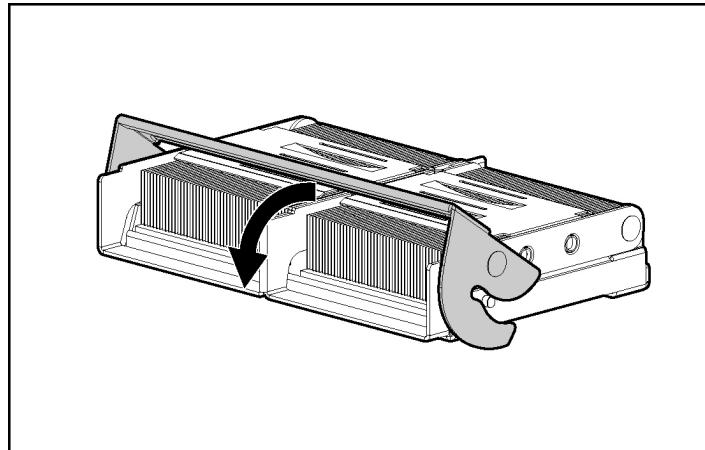
Memory option

The server blade ships with two DIMMs installed in memory bank 1 for each installed processor. Each processor has two banks, and each bank consists of two DIMM slots.

> ⚠ **CAUTION:** Use only HP DIMMs. DIMMs from other sources may adversely affect data integrity.

DIMM guidelines

Observe the following DIMM installation guidelines:

- All DIMMs must be PC3200 DDR 400-MHz SDRAM DIMMs.

- Both DIMM slots in a memory bank must be populated.

- Both DIMMs in a memory bank must be identical.

- Processor 1 memory bank 1 must always be populated.

- If mixing dual- and single-rank DIMMs, the dual-rank DIMMs must be installed in memory bank 1.

- For optimal performance in most applications, populate memory bank 1 for every populated processor socket.

- DIMM banks are active only when the corresponding processor socket is populated.

Single- and dual-rank DIMMs

PC3200 DIMMs can either be single- or dual-rank. While it is not normally important for you to differentiate between these two types of DIMMs, certain DIMM configuration requirements are based on these classifications.

Certain configuration requirements exist with single- and dual-rank DIMMs that allow the architecture to optimize performance. A dual-rank DIMM is similar to having two separate DIMMs on the same module. Although only a single DIMM module, a dual-rank DIMM acts as if it were two separate DIMMs. The primary reason for the existence of dual-rank DIMMs is to provide the largest capacity DIMM given the current DIMM technology. If the maximum DIMM technology allows for creating 2-GB single-rank DIMMs, a dual-rank DIMM using the same technology would be 4-GB.

DIMM numbering

Primary system board (processors 1 and 2) (on page)

Secondary system board (processors 3 and 4) (on page)

Primary system board (processors 1 and 2)
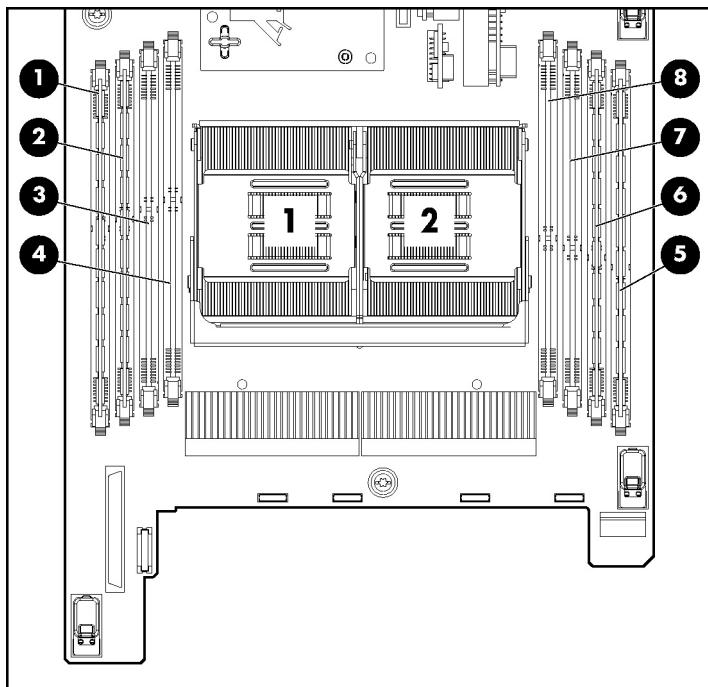
Item	Description	Memory bank
1-2	DIMM slots 1 and 2	Processor 1 memory bank 1
3-4	DIMM slots 3 and 4	Processor 1 memory bank 2
5-6	DIMM slots 5 and 6	Processor 2 memory bank 1
7-8	DIMM slots 7 and 8	Processor 2 memory bank 2

Secondary system board (processors 3 and 4)
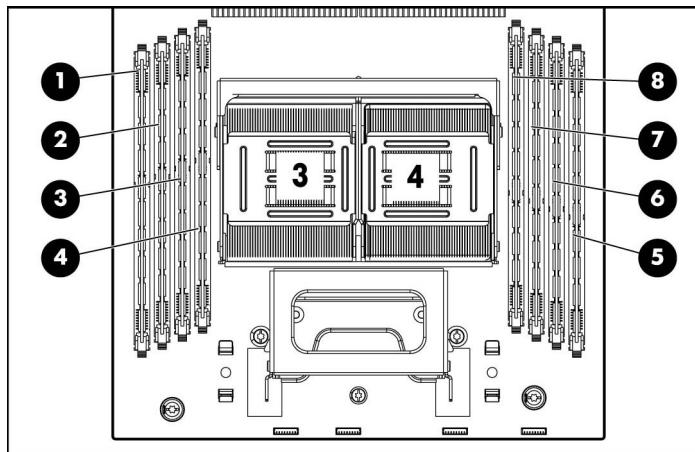
Item	Description	Memory bank
1-2	DIMM slots 9 and 10	Processor 3 memory bank 1
3-4	DIMM slots 11 and 12	Processor 3 memory bank 2
5-6	DIMM slots 13 and 14	Processor 4 memory bank 1
7-8	DIMM slots 15 and 16	Processor 4 memory bank 2

Installing DIMMs

To install the component:

1. Power down the server blade (on page).

2. Remove the server blade (on page).

3. Remove the access panel.

4. Open the DIMM slot latches.

5. Install the DIMM.
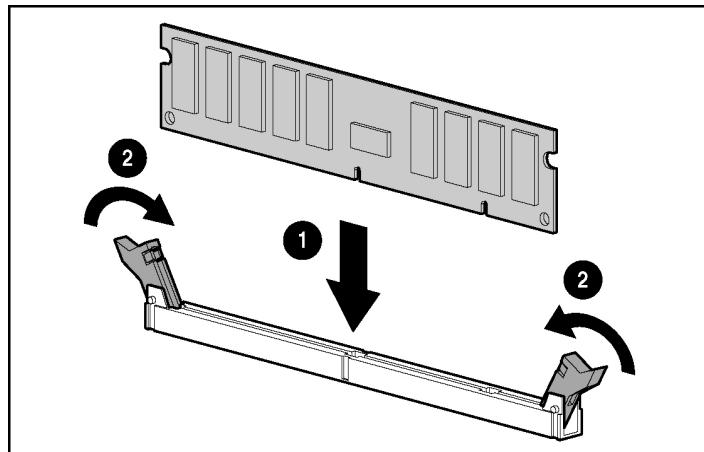
To remove DIMMs, reverse the installation procedure. For DIMM slots 1 and 2, remove the air baffle, if necessary. Refer to the instructions located on the air baffle.

Hard drive option

The server blade hot-plug SCSI hard drives have unique SCSI IDs that the system automatically sets. The IDs number from top to bottom on each server blade.

>   **IMPORTANT:** Always populate hard drive bays starting with SCSI ID 0 (the top bay).

To install the component:

>   **CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

1. Remove the hard drive blank.
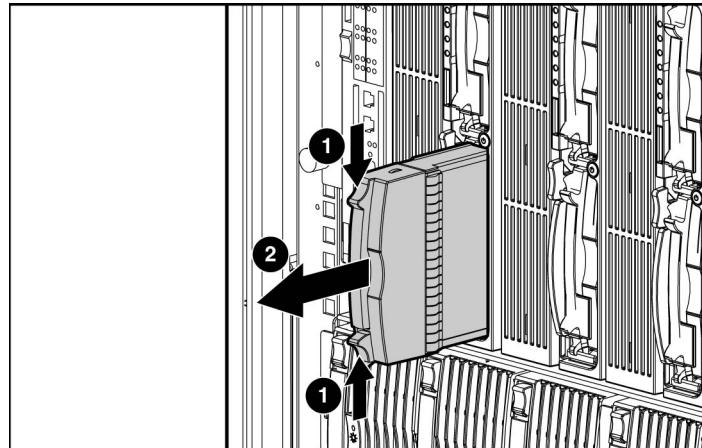
NOTE: Port-colored items indicate hot-plug components.

2. Install the hard drive.
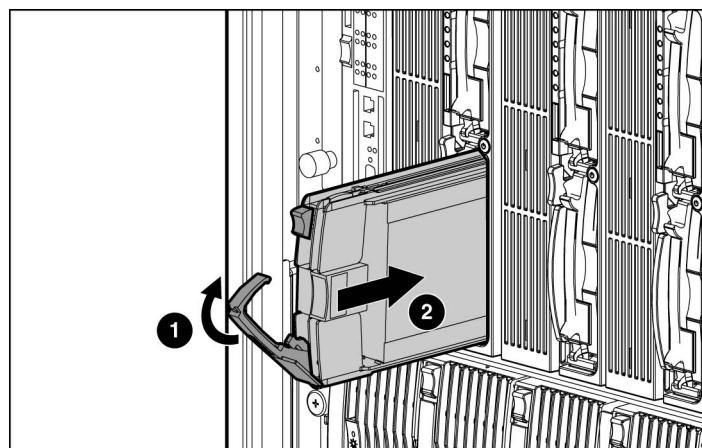
3. Determine the status of the hard drive from the hot-plug hard drive LEDs ("Hot-plug SCSI hard drive LED combinations" on page 10).

4. Resume normal server operations.

Fibre channel adapter option

An optional dual port FC adapter enables FC support for clustering capabilities and SAN connection when used in conjunction with interconnect devices that support a SAN connection. Refer to "SAN Configuration (on page 63)" for more information about connecting to the SAN.

Server blades can be configured for SAN connectivity when used with the following components.

- FC Adapter

- Supported p-Class server blades

- SAN-compatible interconnect

- SFP transceivers (included with the Dual Port FC Adapter)

- Optical FC cables (not included)

- Supported SAN and associated software

For more detailed SAN configuration information for the server blade, refer to:

- The model-specific QuickSpecs document located on the HP ProLiant p-Class server blade products web page at the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)

- The HP StorageWorks SAN documentation at the HP website (http://h18006.www1.hp.com/products/storageworks/san/documentation.html)

- The HP BladeSystem p-Class storage website (http://www.hp.com/go/bladesystem/storage)

To install the component:

1. Power down the server blade (on page 22).

2. Remove the server blade (on page 22).

3. Remove the access panel.

4. Refer to the label on the FC adapter to verify compatibility with the server blade.
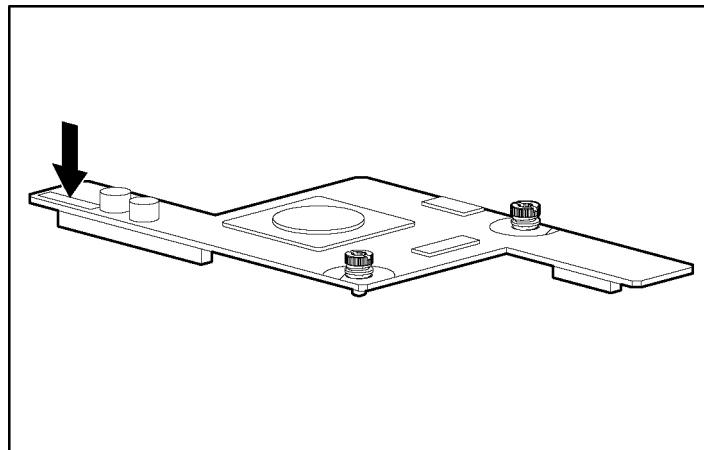
5. Install the FC adapter.
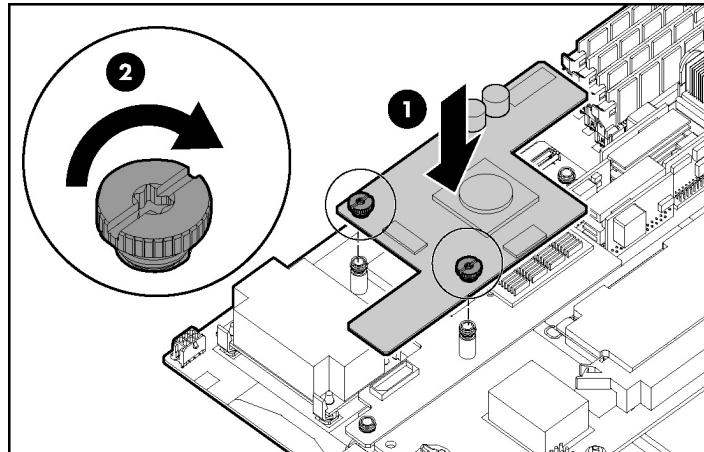
Smart Array 6i Battery-Backed Write Cache Enabler option

The optional BBWC enabler provides the system with a means for storing and saving data in the event of an unexpected system shutdown.

To install the component:

1. Remove the battery from the plastic carrier.

   NOTE: Before removing the battery from the carrier, be sure to unwrap the cable.
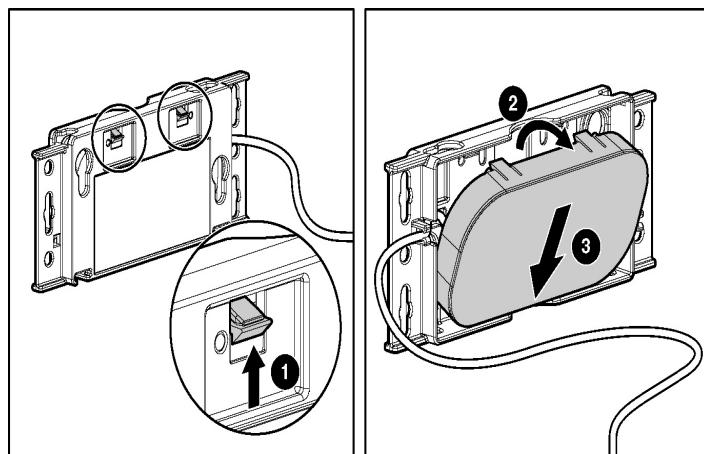
   NOTE: After removing the battery from the plastic carrier, discard the carrier and the cable. The only items required for use with this server blade are the battery and the BBWCE.

2. Install the battery on the BBWC memory module.
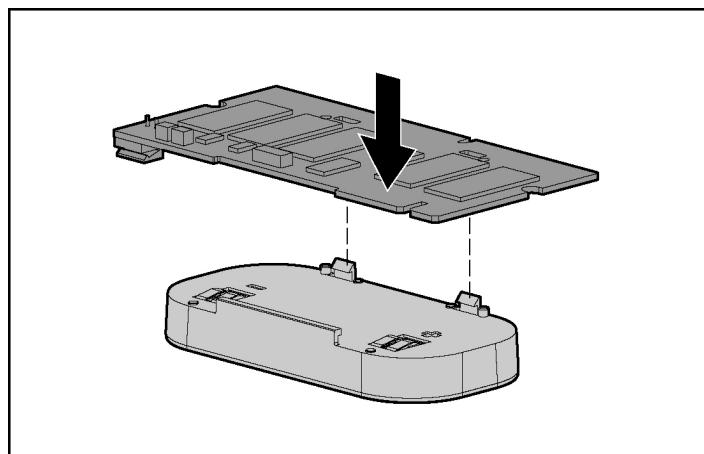
3.   Install the BBWC memory module on the Smart Array 6i Controller.
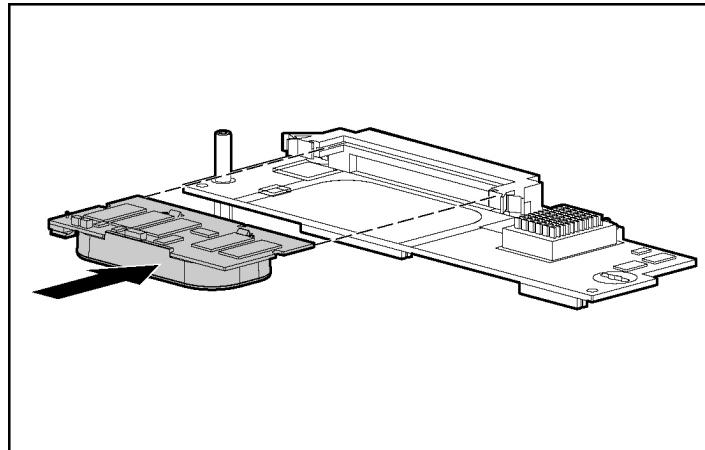
Local I/O cabling

In this section

Using the local I/O cable

The local I/O cable enables the user to perform server blade administration, configuration, and diagnostic procedures in two ways:

- Connecting locally to the server blade RILOE interface

- Connecting video and USB devices directly to the server blade

Local administration using iLO

To connect locally to RILOE with the local I/O cable, you must have the following:

- A client device with a 10/100 Ethernet RJ-45 connector

- A network cable with RJ-45 connectors

To connect to iLO:

⚠ **CAUTION:** Do not connect the local I/O cable to a hub when connecting to RILOE. All server blades have the same IP address through the I/O port. Multiples on a hub make the server blades indistinguishable on the network.

1. Use the RJ-45 network cable to connect the local client device to the local I/O cable.
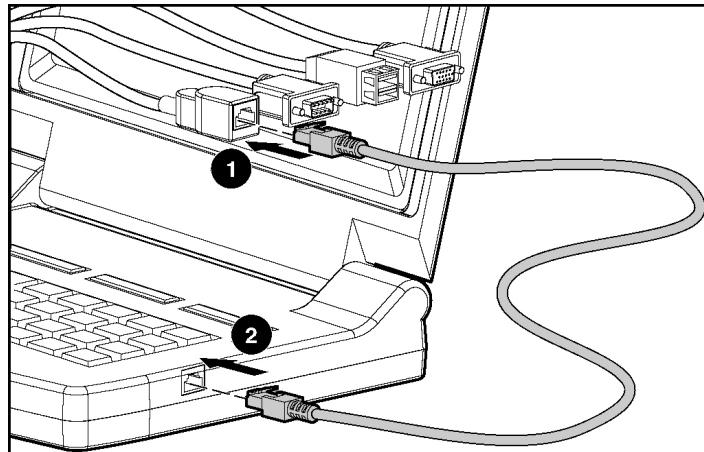
2. Connect the local I/O cable to the I/O port on the server blade.
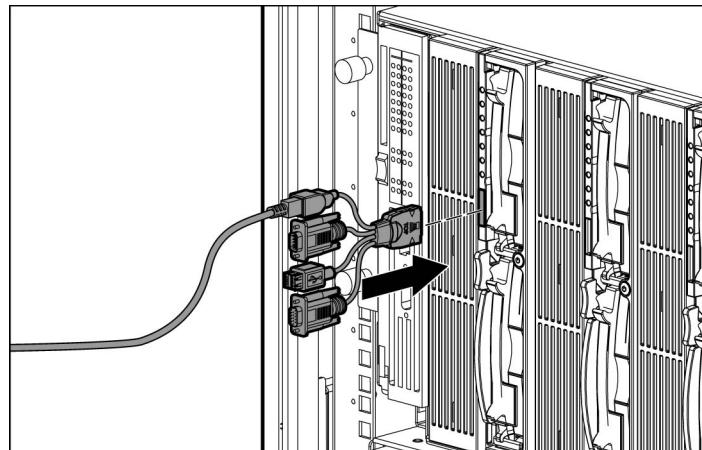
⚠ **CAUTION:** Disconnect the local I/O cable when not in use. The port and connector do not provide a permanent connection. Rear RILOE connector performance degrades when the local I/O cable is connected, even if the RILOE connector on the cable is not in use.

△ **CAUTION:** Before disconnecting the local I/O cable, observe the following guidelines:

- Completely log out of the current RILOE session before disconnecting from the RILOE port. Do not remove the local I/O cable when the UID LED is flashing.

- Always squeeze the locking buttons on the side of the server blade connector before disconnecting from the I/O port. Failure to do so can result in damage to the equipment.

Connecting locally to a server blade with video and USB devices

To connect locally, use the local I/O cable and any of the following USB devices:

- Monitor
- USB hub
- USB keyboard
- USB mouse
- USB CD-ROM drive
- USB diskette drive

Numerous configurations are possible. This section offers two possible configurations.

Accessing a server blade with local KVM

△ **CAUTION:** Disconnect the local I/O cable when not in use. The port and connector do not provide a permanent connection. Rear RILOE connector performance degrades when the local I/O cable is connected, even if the RILOE connector on the cable is not in use.

NOTE: For this configuration, a USB hub is not necessary. To connect additional devices, use a USB hub.

1. Connect the local I/O cable to the server blade.

2. Connect a monitor to the video connector.

3. Connect a USB mouse to one USB connector.

4. Connect a USB keyboard to the second USB connector.
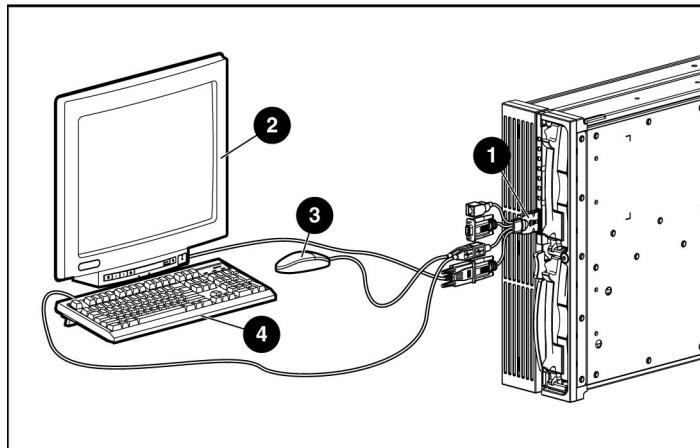
Item	Description
1	Server blade
2	Monitor
3	USB mouse
4	USB keyboard

Accessing a server blade with local media devices

Use the following configuration when configuring a server blade or loading software updates and patches from a CD-ROM, such as the SmartStart CD, or a diskette.

⚠ **CAUTION:** Disconnect the local I/O cable when not in use. The port and connector do not provide a permanent connection. Rear RILOE connector performance degrades when the local I/O cable is connected, even if the RILOE connector on the cable is not in use.

1. Connect the local I/O cable to the server blade.

2. Connect the video connector to a monitor.

3. Connect a USB hub to one USB connector.

4. Connect the following to the USB hub:

    – USB CD-ROM drive

    – USB keyboard

    – USB mouse

        NOTE: HP recommends the use of a USB hub when connecting a USB
        diskette drive and/or USB CD-ROM drive to the server blade. The USB
        hub provides additional connections.
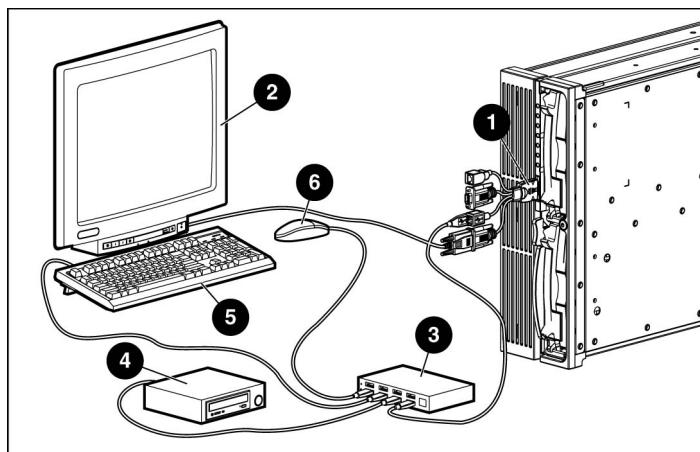
Item	Description
1	Server blade
2	Monitor
3	USB hub
4	USB CD-ROM drive or USB diskette drive
5	USB keyboard
6	USB mouse

Configuration and utilities

In this section

Server blade deployment tools

List of tools:

Software drivers and additional components

HP offers the following additional software components for server blades:

- Health and Wellness driver and IML viewer

- RILOE Advanced Management interface driver

- Rack infrastructure interface service

For Microsoft® Windows® OS users, these items are included in the ProLiant Support Pack for Microsoft® Windows®, available from the HP website (http://h18002.www1.hp.com/support/files/server/us/index.html).

Linux OS users can download these components from the HP website (http://www.hp.com/products/servers/linux).

For information on how to use these components with a Linux OS, refer to the HP website (http://h18000.www1.hp.com/products/servers/linux/documentation.html#howtos).

ProLiant p-Class Advanced management

RILOE Advanced is a standard component of ProLiant p-Class server blades that provides server health and remote server blade manageability. Its features are accessed from a network client device using a supported web browser. In addition to other features, RILOE Advanced provides keyboard, mouse, and video (text and graphics) capability for a server blade, regardless of the state of the host OS or host server blade.

RILOE includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes RILOE independent of the host server blade and its OS. RILOE provides remote access to any authorized network client, sends alerts, and provides other server blade management functions.

Using a supported web browser, you can:

- Remotely access the console of the host server blade, including all text mode and graphics mode screens with full keyboard and mouse controls.

- Remotely power up, power down, or reboot the host server blade.

- Remotely boot a host server blade to a virtual diskette image to perform a ROM upgrade or install an OS.

- Send alerts from RILOE Advanced regardless of the state of the host server blade.

- Access advanced troubleshooting features provided by RILOE Advanced.

- Launch a web browser, use SNMP alerting, and diagnose the server blade with HP SIM.

- Configure static IP bay settings for the dedicated RILOE management NICs on each server blade in an enclosure for faster deployment.

The server blade must be properly cabled for RILOE connectivity. Connect to the server blade with one of the following methods:

- Through an existing network (in the rack)—This method requires you to install the server blade in its enclosure and assign it an IP address manually or using DHCP.

- Through the server blade I/O port

  - In the rack—This method requires you to connect the local I/O cable to the I/O port and a client PC. Using the static IP address listed on the I/O cable label and the initial access information on the front of the server blade, you can access the server blade with the RILOE Advanced Remote Console.

  - Out of the rack, with the diagnostic station—This method requires you to power the server blade with the optional diagnostic station and connect to an external computer using the static IP address and the local I/O cable. For cabling instructions, refer to the documentation that ships with the diagnostic station or to the Documentation CD.

  - Through the server blade rear panel connectors (out of the rack, with the diagnostic station)—This method enables you to configure a server blade out of the rack by powering the server blade with the diagnostic station and connecting to an existing network through a hub. The IP address is assigned by a DHCP server on a network.

The p-Class tab enables you to control specific settings for the HP BladeSystem. RILOE also provides web-based status for the HP BladeSystem configuration.

For detailed information about RILOE Advanced, refer to the *HP Integrated Lights-Out User Guide* on the HP website (http://www.hp.com/servers/lights-out).

Network-based PXE deployment

PXE is a component of the Intel® WfM specification. The PXE model enables server blades to load and execute an NBP from a PXE server and to execute a pre-configured image. The image can be an OS image created by software utilities or a boot diskette image. This feature enables a user to configure a server blade and install an OS over a network.

Deployment overview

When a PXE-enabled client boots, it obtains an IP address from a DHCP server. The client obtains the name of the NBP from the appropriate boot server. Then, the client uses TFTP to download the NBP from the boot server and executes the image.

For each server blade being deployed, the PXE server must be connected to the NIC designated for PXE. The server blade defaults PXE functions to NIC 1, but any of the two NC series NICs can be designated for PXE in RBSU. For NIC connector locations on RJ-45 patch panels and interconnect switches, refer to the documentation included with the server blade.

> **NOTE:** Actual NIC numeration depends on several factors, including the OS installed on the server blade.

To deploy an OS to multiple server blades, install a PXE deployment server on a network.

Deployment infrastructure

To establish a network-based PXE deployment infrastructure, provide the following software and minimum hardware:

- Client PC (administrative workstation)
    - AMD Athlon™ XP processor (700 MHz or greater recommended), AMD Athlon™ 64 processor, or Intel® Pentium® III or higher processor (700 MHz or greater recommended)
    - 128 MB of RAM
    - Microsoft® Windows® 2000 Professional or Microsoft® Windows® XP OS
    - Microsoft® Internet Explorer 5.5 or above with 128-bit encryption
    - Ethernet NIC with 10/11 RJ-45 connector
    - TCP/IP networking and an IP address compatible with one of the following: the iLO Diagnostic Port IP address or an assigned DHCP or static IP address
    - CD-ROM drive and/or diskette drive

- Any of the following Java™ Runtime Environment versions:

    1.3.1_02

    1.3.1_07

    1.3.1_08

    1.4.1 for Windows® users only

    1.4.2 for Linux users only

    Access the Java™ Runtime Environment versions at the HP website (http://java.sun.com/products/archive/index.html).

- DHCP server (IP address assignment)
    - AMD Athlon™ XP processor (700 MHz or greater recommended), AMD Athlon™ 64 processor, or Pentium® or Pentium® II 200-MHz or faster processor
    - 64 MB of RAM
    - 64 MB of free hard drive space
    - 10-Mb/s network adapter
- PXE deployment server (storing boot images)
    - AMD Athlon™ XP processor (700 MHz or greater recommended), AMD Athlon™ 64 processor, or Intel® Pentium® III or higher processor (500 MHz recommended)
    - 256 MB of RAM
    - 10-Mb/s network adapter
    - CD-ROM drive
- NFS repository server (only required for Red Hat Linux deployment)
    - Red Hat Linux 7.2 OS installed
    - Network connection
    - CD-ROM drive
    - NFS installed
    - 1.5 GB of available disk space

- Windows® repository server (only required for Windows® deployment)
  - Windows® 2000 or Windows® 2003 OS installed
  - Network connection
  - CD-ROM drive
  - 1.5 GB of available disk space
  - TCP/IP networking and an IP address compatible with one of the following: the iLO Diagnostic Port IP address or an assigned DHCP or static IP address
  - CD-ROM drive and/or diskette drive
  - Any of the following Java™ Runtime Environment versions:

    1.3.1_02

    1.3.1_07

    1.3.1_08

    1.4.1 for Windows® users only

    1.4.2 for Linux users only

    Access the Java™ Runtime Environment versions at the HP website (http://java.sun.com/products/archive/index.html).

- Network server with an OS installed

Static IP bay configuration

Static IP bay configuration, implemented using the new Static IP Bay Settings on the BL p-Class tab, eases the initial deployment of an entire enclosure or the subsequent deployment of blades within an existing enclosure. While the preferred method for assigning IP addresses the RILOE to each blade is through DHCP and DNS, these protocols are not always available on non-production networks.

Static IP bay configuration automates the first step of BL p-Class blade deployment by enabling the RILOE management processor in each blade slot to obtain a predefined IP address without relying on DHCP. RILOE is immediately accessible for server deployment using Virtual Media and other remote administration functions.

Static IP bay configuration uses the Static IP Bay Configuration addressing method which enables you to assign IP addresses to each iLO based on slot location in the respective server enclosure. By providing a set of IP addresses in the enclosure, you gain the advantages of a static IP bay configuration, without requiring each individual RILOE to be configured locally.

Using RILOE static IP bay configuration:

- Helps avoid the costs of a DHCP infrastructure to support the blade environment

- Provides easier setup with automatic RILOE address generation for all or a few selected bays

For detailed information about iLO configurations, refer to the *HP Integrated Lights-Out User Guide* on the Documentation CD or to the HP website (http://www.hp.com/servers/lights-out).

Deployment methods

Four primary deployment methods are supported:

> **IMPORTANT:** To deploy a server blade without the RDP, create a bootable diskette or image of a bootable diskette.

- PXE deployment (on page 58)
- CD-ROM deployment (on page 59)
- Diskette image deployment (on page 61)
- SAN configuration (on page 63)

PXE deployment

PXE enables server blades to load an image over the network from a PXE server, and then execute it in memory. The first NIC on the server blade is the default PXE boot NIC, but any of the other NC series NICs can be configured to boot PXE. For more information, refer to "Network-Based PXE Deployment (on page 53)."

> **NOTE:** Actual NIC numeration depends on several factors, including the OS installed on the server blade.

HP recommends using one of the following methods for PXE deployment:

- HP ProLiant Essentials RDP ("HP ProLiant Essentials Rapid Deployment Pack" on page 58)

- SmartStart Scripting Toolkit (on page 59)

A number of third-party PXE deployment tools are available for Windows® and Linux. For additional information, refer to the HP website (ftp://ftp.compaq.com/pub/products/servers/management/pxe_wp.pdf).

HP ProLiant Essentials Rapid Deployment Pack

> **NOTE:** To deploy server blades in an existing server blade enclosure, always use the most recent version of RDP available at the HP website (http://www.hp.com/servers/rdp).

The RDP software is the preferred method for rapid, high-volume server deployments. The RDP software integrates two powerful products: Altiris Deployment Solution and the HP ProLiant Integration Module.

The intuitive graphical user interface of the Altiris Deployment Solution console provides simplified point-and-click and drag-and-drop operations that enable you to deploy target servers, including server blades, remotely. It enables you to perform imaging or scripting functions and maintain software images.

For more information about the RDP, refer to the HP ProLiant Essentials Rapid Deployment Pack CD or refer to the HP website (http://www.hp.com/servers/rdp).

SmartStart Scripting Toolkit

The SmartStart Scripting Toolkit is a server deployment product that delivers an unattended automated installation for high-volume server deployments. The SmartStart Scripting Toolkit is designed to support ProLiant BL, ML, and DL servers. The toolkit includes a modular set of utilities and important documentation that describes how to apply these new tools to build an automated server deployment process.

Using SmartStart technology, the Scripting Toolkit provides a flexible way to create standard server configuration scripts. These scripts are used to automate many of the manual steps in the server configuration process. This automated server configuration process cuts time from each server deployed, making it possible to scale server deployments to high volumes in rapid fashion.

For more information, and to download the SmartStart Scripting Toolkit, refer to the HP website (http://www.hp.com/servers/sstoolkit).

CD-ROM deployment

CD-ROM deployment involves using a bootable CD that executes script to configure the hardware and install the OS. After the OS is configured, the server blade can access the network to locate the scripts and files necessary for deployment.

Before beginning the deployment process, connect the server blade to the network with one of the following methods:

- Through an existing network (in the rack)—For this method, install the server blade in its enclosure and assign it an IP address (manually or with DHCP).

- Through an existing network (out of the rack, with the diagnostic station)— For this method, power the server blade with the diagnostic station and connect to an existing network through a hub. The DHCP server on the network assigns the IP address.

Other methods for connecting to the server blade are available, but they do not provide the required network access for deployment. For more information, refer to "ProLiant p-Class Advanced management (on page 52)."

> **NOTE:** For more information about hardware and cabling
> configurations, refer to the documents that ship with the server blade
> enclosure or diagnostic station.

Two methods are available for CD-ROM deployment:

- iLO Virtual CD-ROM (on page 60)

- USB CD-ROM (on page 60)

iLO virtual CD-ROM

To deploy with a boot CD:

1. Do one of the following:

   - Insert the boot CD into the client PC that is using the RILOE Remote
     Console.

   - Use RILOE to create an image file of the boot CD.

   - Copy the image of the boot CD to a location on the network or the client
     PC hard drive.

2. Remotely access the server blade through RILOE. Refer to "ProLiant p-Class
   Advanced management (on page 52)."

3. Click the **Virtual Devices** tab.

4. Select **Virtual Media**.

5. Use the Virtual Media applet to select the local CD or image file and connect
   the Virtual CD to the server blade.

6. Use the RILOE Virtual Power Button feature to reboot the server blade.

7. After the server blade boots, follow the normal network installation
   procedure for the OS.

USB CD-ROM

This method uses SmartStart to facilitate loading the OS. However, SmartStart
also allows for manual loading of the OS and drivers.

To deploy with a boot CD:

1. Use the local I/O cable to connect a USB CD-ROM drive to the server blade. Refer to "Connecting locally to a server blade with video and USB devices (on page 47)."

2. Insert the boot CD into the USB CD-ROM drive.

3. Reboot the server blade.

4. After the server blade boots, follow the normal installation procedure for an OS.

Diskette image deployment

To deploy with a diskette image, the user creates a DOS-based network-enabled boot diskette that executes a script that configures the hardware and installs the OS. The diskette enables the server blade to access the required deployment scripts and files on the network.

This method implies a deployment infrastructure that may include an administrator workstation, PXE server, Microsoft® Windows® file share, or a Linux file share. For more information, refer to "Deployment infrastructure (on page 54)."

Before beginning the deployment process, connect the server blade to the network with one of the following methods:

*   Through an existing network (in the rack)—For this method, install the server blade in its enclosure and assign it an IP address (manually or with DHCP).

*   Through an existing network (out of the rack, with the diagnostic station)— For this method, power the server blade with the diagnostic station and connect to an existing network through a hub. The DHCP server on the network assigns the IP address.

Other methods for connecting to the server blade are available, but they do not provide the required network access for deployment. For more information, refer to "ProLiant p-Class Advanced management (on page 52)."

> **NOTE:** For more information about hardware and cabling configurations, refer to the documents that ship with the server blade enclosure or diagnostic station.

Two methods are available for diskette image deployment:

- iLO Virtual Floppy (on page 62)

- PXE ("PXE deployment" on page 58)

Creating a boot diskette

The SmartStart Scripting Toolkit provides the tools and information for creating a boot diskette. For details, refer to the *SmartStart Scripting Toolkit User Guide* and download the latest version of the software from the HP website (http://www.hp.com/servers/sstoolkit).

As an alternative method, configure the hardware manually with RBSU and the RILOE remote console. With this method, the disk is more generic and integrates with an existing network OS installation process. For more information, refer to "ProLiant p-Class Advanced management (on page 52)."

To operate properly, the server blade must have a supported OS. For the latest information on a supported OS, refer to the HP website (http://www.hp.com/go/supportos).

iLO virtual floppy

To deploy with a boot diskette:

1. Do one of the following:
   - Insert the boot diskette into the client PC that is using the RILOE Remote Console.
   - Use RILOE to create an image file of the boot diskette.
   - Copy the image of the boot diskette to a location on the network or the client PC hard drive.
2. Remotely access the server blade through RILOE. Refer to "ProLiant p-Class Advanced management (on page 52)."
3. Click the **Virtual Devices** tab.
4. Select **Virtual Media**.
5. Use the Virtual Media applet to select the local diskette or image file and connect the Virtual CD to the server blade.

6. Use the RILOE Virtual Power Button feature to reboot the server blade.

7. After the server blade boots, follow the normal network installation procedure for the OS.

SAN configuration

The server blade provides FC support for SAN implementations. This solution uses an optional FCA that offers redundant SAN connectivity and optimization for HP StorageWorks products. The server blade is also compatible with certain third-party SAN products. For more information, refer to the documentation that ships with the FCA option.

For optimal SAN connectivity, observe the following guidelines:

*   The FCA option is installed correctly in the server blade. Refer to the documentation that ships with the FCA option.

*   An FC-compatible interconnect is installed in the enclosure. Refer to the documentation that ships with the interconnect option.

*   The server blade enclosure management module firmware is up-to-date. Refer to the HP Business Support Center website (http://www.hp.com/support).

*   The server blade is cabled properly to a supported SAN.

*   SAN storage drivers are loaded. Refer to supporting white papers and the HP website (http://www.hp.com/servers/rdp).

For SAN configuration information for the server blade, refer to the *HP StorageWorks SAN Design Reference Guide* on the HP website (http://h18000.www1.hp.com/products/storageworks/san/documentation.html).

Configuration tools

List of tools:

SmartStart software

SmartStart is a collection of software that optimizes single-server setup, providing a simple and consistent way to deploy server configuration. SmartStart has been tested on many ProLiant server products, resulting in proven, reliable configurations.

SmartStart assists the deployment process by performing a wide range of configuration activities, including:

- Configuring hardware using embedded configuration utilities, such as RBSU and ORCA

- Preparing the system for installing "off-the-shelf" versions of leading operating system software

- Installing optimized server drivers, management agents, and utilities automatically with every assisted installation

- Testing server hardware using the Insight Diagnostics Utility ("HP Insight Diagnostics" on page 72)

- Installing software drivers directly from the CD. With systems that have internet connection, the SmartStart Autorun Menu provides access to a complete list of ProLiant system software.

- Enabling access to the Array Configuration Utility (on page 67), Array Diagnostic Utility, and Erase Utility

SmartStart is included in the HP ProLiant Essentials Foundation Pack. For more information about SmartStart software, refer to the HP ProLiant Essentials Foundation Pack or the HP website (http://www.hp.com/servers/smartstart).

HP ROM-Based Setup Utility

RBSU, an embedded configuration utility, performs a wide range of configuration activities that may include:

- Configuring system devices and installed options

- Displaying system information

- Selecting the primary boot controller

- Configuring memory options

- Language selection

For more information on RBSU, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (http://www.hp.com/servers/smartstart).

Using RBSU

The first time you power up the server blade, the system prompts you to enter RBSU and select a language. Default configuration settings are made at this time and can be changed later. Most of the features in RBSU are not required to set up the server blade.

To navigate RBSU, use the following keys:

- To access RBSU, press the **F9** key during power up when prompted in the upper right corner of the screen.

- To navigate the menu system, use the arrow keys.

- To make selections, press the **Enter** key.

   IMPORTANT: RBSU automatically saves settings when you press the **Enter** key. The utility does not prompt you for confirmation of settings before you exit the utility. To change a selected setting, you must select a different setting and press the **Enter** key.

Auto-configuration process

The auto-configuration process automatically runs when you boot the server for the first time. During the power-up sequence, the system ROM automatically configures the entire system without needing any intervention. During this process, the ORCA utility, in most cases, automatically configures the array to a default setting based on the number of drives connected to the server.

   NOTE: The server may not support all the following examples.

> **NOTE:** If the boot drive is not empty or has been written to in the past, ORCA does not automatically configure the array. You must run ORCA to configure the array settings.

Drives installed	Drives used	RAID level
1	1	RAID 0
2	2	RAID 1
3, 4, 5, or 6	3, 4, 5, or 6	RAID 5
More than 6	0	None

To change any ORCA default settings and override the auto-configuration process, press the **F8** key when prompted.

By default, the auto-configuration process configures the system for the English language. To change any default settings in the auto-configuration process (such as the settings for language, operating system, and primary boot controller), execute RBSU by pressing the **F9** key when prompted. After the settings are selected, exit RBSU and allow the server to reboot automatically.

For more information, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (http://www.hp.com/servers/smartstart).

Boot options

After the auto-configuration process completes, or after the server reboots upon exit from RBSU, the POST sequence runs, and then the boot option screen is displayed. This screen is visible for several seconds before the system attempts to boot from either a diskette, CD, or hard drive. During this time, the menu on the screen allows you to install an operating system or make changes to the server configuration in RBSU.

BIOS Serial Console

BIOS Serial Console allows you to configure the serial port to view POST error messages and run RBSU remotely through a serial connection to the server COM port. The server that you are remotely configuring does not require a keyboard and mouse.

For more information about BIOS Serial Console, refer to the *BIOS Serial Console User Guide* on the Documentation CD or the HP website (http://www.hp.com/servers/smartstart).

Array Configuration Utility

ACU is a browser-based utility with the following features:

- Runs as a local application or remote service

- Supports online array capacity expansion, logical drive extension, assignment of online spares, and RAID or stripe size migration

- Suggests the optimum configuration for an unconfigured system

- Provides different operating modes, enabling faster configuration or greater control over the configuration options

- Remains available any time that the server is on

- Displays on-screen tips for individual steps of a configuration procedure

For optimum performance, the minimum display settings are 800×600 resolution and 256 colors. Servers running Microsoft® operating systems require Internet Explorer 5.5 (with Service Pack 1) or later. For Linux servers, refer to the README.TXT file for additional browser and support information.

For more information, refer to the *HP Array Configuration Utility User Guide* on the Documentation CD or the HP website (http://www.hp.com).

Option ROM Configuration for Arrays

Before installing an operating system, you can use the ORCA utility to create the first logical drive, assign RAID levels, and establish online spare configurations.

The utility also provides support for the following functions:

- Reconfiguring one or more logical drives

- Viewing the current logical drive configuration

- Deleting a logical drive configuration

- Setting the controller to be the boot controller

If you do not use the utility, ORCA will default to the standard configuration.

For more information regarding array controller configuration, refer to the controller user guide.

For more information regarding the default configurations that ORCA uses, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD.

Re-entering the server serial number and product ID

After you replace the system board, you must re-enter the server serial number and the product ID.

1. During the server startup sequence, press the **F9** key to access RBSU.

2. Select the **System Options** menu.

3. Select **Serial Number**. The following warning is displayed:

   ```
   WARNING! WARNING! WARNING! The serial number is loaded
   into the system during the manufacturing process and
   should NOT be modified. This option should only be used
   by qualified service personnel. This value should always
   match the serial number sticker located on the chassis.
   ```

4. Press the **Enter** key to clear the warning.

5. Enter the serial number and press the **Enter** key.

6. Select **Product ID**.

7. Enter the product ID and press the **Enter** key.

8. Press the **Esc** key to close the menu.

9. Press the **Esc** key to exit RBSU.

10. Press the **F10** key to confirm exiting RBSU. The server will automatically reboot.

Management tools

List of tools:

Automatic Server Recovery

ASR is a feature that causes the system to restart when a catastrophic operating system error occurs, such as a blue screen, ABEND, or panic. A system fail-safe timer, the ASR timer, starts when the System Management driver, also known as the Health Driver, is loaded. When the operating system is functioning properly, the system periodically resets the timer. However, when the operating system fails, the timer expires and restarts the server.

ASR increases server availability by restarting the server within a specified time after a system hang or shutdown. At the same time, the HP SIM console notifies you by sending a message to a designated pager number that ASR has restarted the system. You can disable ASR from the HP SIM console or through RBSU.

ROMPaq utility

Flash ROM enables you to upgrade the firmware (BIOS) with system or option ROMPaq utilities. To upgrade the BIOS, insert a ROMPaq diskette into the diskette drive and boot the system.

The ROMPaq utility checks the system and provides a choice (if more than one exists) of available ROM revisions. This procedure is the same for both system and option ROMPaq utilities.

For more information about the ROMPaq utility, refer to the HP website (http://www.hp.com/servers/manage).

Integrated Lights-Out technology

The iLO subsystem is a standard component of selected ProLiant servers that provides server health and remote server manageability. The iLO subsystem includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes iLO independent of the host server and its operating system. The iLO subsystem provides remote access to any authorized network client, sends alerts, and provides other server management functions.

Using iLO, you can:

- Remotely power up, power down, or reboot the host server.

- Send alerts from iLO regardless of the state of the host server.

- Access advanced troubleshooting features through the iLO interface.

- Diagnose iLO using HP SIM through a web browser and SNMP alerting.

For more information about iLO features, refer to the *Integrated Lights-Out User Guide* on the Documentation CD or on the HP website (http://www.hp.com/servers/lights-out).

HP Systems Insight Manager

HP SIM is a web-based application that allows system administrators to accomplish normal administrative tasks from any remote location, using a web browser. HP SIM provides device management capabilities that consolidate and integrate management data from HP and third-party devices.

> **IMPORTANT:** You must install and use HP SIM to benefit from the Pre-Failure Warranty for processors, hard drives, and memory modules.

For additional information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack or the HP SIM website (http://www.hp.com/go/hpsim).

Management Agents

Management Agents provide the information to enable fault, performance, and configuration management. The agents allow easy manageability of the server through HP SIM software, and third-party SNMP management platforms. Management Agents are installed with every SmartStart assisted installation or can be installed through the HP PSP. The Systems Management homepage provides status and direct access to in-depth subsystem information by accessing data reported through the Management Agents. For additional information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack or the HP website (http://www.hp.com/servers/manage).

Redundant ROM support

The server enables you to upgrade or configure the ROM safely with redundant ROM support. The server has a 4-MB ROM that acts as two, separate 2-MB ROMs. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains a backup version.

> **NOTE:** The server ships with the same version programmed on each side of the ROM.

Safety and security benefits

When you flash the system ROM, ROMPaq writes over the backup ROM and saves the current ROM as a backup, enabling you to switch easily to the alternate ROM version if the new ROM becomes corrupted for any reason. This feature protects the existing ROM version, even if you experience a power failure while flashing the ROM.

USB support

HP provides both standard USB support and legacy USB support. Standard support is provided by the operating system through the appropriate USB device drivers. HP provides support for USB devices before the operating system loading through legacy USB support, which is enabled by default in the system ROM. HP hardware supports USB version 1.1.

Legacy USB support provides USB functionality in environments where USB support is normally not available. Specifically, HP provides legacy USB functionality at:

- POST

- RBSU

- Diagnostics

- DOS

- Environments which do not support USB natively

For more information on ProLiant USB support, refer to the HP website (http://www.compaq.com/products/servers/platforms/usb-support.html).

Diagnostic tools

List of tools:

HP Insight Diagnostics

HP Insight Diagnostics is a proactive server blade management tool, available in both offline and online versions, that provides diagnostics and troubleshooting capabilities to assist IT administrators who verify server blade installations, troubleshoot problems, and perform repair validation.

HP Insight Diagnostics Offline Edition performs various in-depth system and component testing while the OS is not running. To run this utility, launch the SmartStart CD.

HP Insight Diagnostics Online Edition is a web-based application that captures system configuration and other related data needed for effective server blade management. Available in Microsoft® Windows® and Linux versions, the utility helps to ensure proper system operation.

For more information or to download the utility, refer to the HP website (http://www.hp.com/servers/diags).

Survey Utility

Survey Utility, a feature within Insight Diagnostics, gathers critical hardware and software information on ProLiant servers.

This utility supports operating systems that may not be supported by the server. For operating systems supported by the server, refer to the HP website (http://www.hp.com/go/supportos).

If a significant change occurs between data-gathering intervals, the Survey Utility marks the previous information and overwrites the Survey text files to reflect the latest changes in the configuration.

Survey Utility is installed with every SmartStart-assisted installation or can be installed through the HP PSP.

Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with 1-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within HP SIM ("HP Systems Insight Manager" on page 70)

- From within Survey Utility

- From within operating system-specific IML viewers

  - For NetWare: IML Viewer

  - For Windows®: IML Viewer

  - For Linux: IML Viewer Application

- From within HP Insight Diagnostics (on page 72)

For more information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack.

Remote support and analysis tools

List of tools:

HP Instant Support Enterprise Edition

ISEE is a proactive remote monitoring and diagnostic tool to help manage your systems and devices, a feature of HP support. ISEE provides continuous hardware event monitoring and automated notification to identify and prevent potential critical problems. Through remote diagnostic scripts and vital system configuration information collected about your systems, ISEE enables fast restoration of your systems. Install ISEE on your systems to help mitigate risk and prevent potential critical problems.

For more information on ISEE, refer to the HP website (http://www.hp.com/hps/hardware/hw_enterprise.html).

To download HP ISEE, visit the HP website (http://www.hp.com/hps/hardware/hw_downloads.html).

For installation information, refer to the HP ISEE Client Installation and Upgrade Guide (ftp://ftp.hp.com/pub/services/hardware/info/isee_client.pdf).

Web-Based Enterprise Service

WEBES enables administrators to manage hardware events proactively, either locally or online. The service provides real-time multiple event analysis, crash analysis, and notification, locally through SMTP and remotely through ISEE for OpenVMS, Tru64, and Microsoft® Windows® operating system binary error logs.

For more information, refer to the HP website
(http://h18000.www1.hp.com/support/svctools/).

Open Services Event Manager

OSEM is a standalone tool that performs real-time reactive and proactive service event filtering, analysis, and notification. The tool gathers event data from SNMP traps or information provided over an HTTP interface and notifies an administrator or HP through SMTP and ISEE.

For more information, refer to the HP website
(http://h18000.www1.hp.com/support/svctools/).

Keeping the system current

List of tools:

Drivers

The server includes new hardware that may not have driver support on all operating system installation media.

If you are installing a SmartStart-supported operating system, use the SmartStart software (on page 64) and its Assisted Path feature to install the operating system and latest driver support.

> **NOTE:** If you are installing drivers from the SmartStart CD or the
> Software Maintenance CD, refer to the SmartStart website
> (http://www.hp.com/servers/smartstart) to be sure that you are using the
> latest version of SmartStart. For more information, refer to the
> documentation provided with the SmartStart CD.

If you do not use the SmartStart CD to install an operating system, drivers for
some of the new hardware are required. These drivers, as well as other option
drivers, ROM images, and value-add software can be downloaded from the HP
website (http://www.hp.com/support).

> **IMPORTANT:** Always perform a backup before installing or updating
> device drivers.

Resource Paqs

Resource Paqs are operating system-specific packages of tools, utilities, and
information for HP servers running certain Microsoft® or Novell operating
systems. The Resource Paqs include utilities to monitor performance, software
drivers, customer support information, and whitepapers on the latest server
integration information. Refer to the Enterprise Partnerships website
(http://h18000.www1.hp.com/partners), select **Microsoft** or **Novell**, depending
on the operating system, and follow the link to the appropriate Resource Paq.

ProLiant Support Packs

PSPs represent operating system-specific bundles of ProLiant optimized drivers,
utilities, and management agents. Refer to the PSP website
(http://h18000.www1.hp.com/products/servers/management/psp.html).

Operating system version support

Refer to the operating system support matrix (http://www.hp.com/go/supportos).

System online ROM flash component utility

The Online ROM Flash Component Utility enables system administrators to
efficiently upgrade system or controller ROM images across a wide range of
servers and array controllers. This tool has the following features:

- Works offline and online

- Supports Microsoft®, Windows® 2000, Windows® Server 2003, Novell Netware, and Linux operating systems

    IMPORTANT: This utility supports operating systems that may not be supported by the server. For operating systems supported by the server, refer to the HP website (http://www.hp.com/go/supportos).

- Integrates with other software maintenance, deployment, and operating system tools

- Automatically checks for hardware, firmware, and operating system dependencies, and installs only the correct ROM upgrades required by each target server

To download the tool and for more information, refer to the HP website (http://h18000.www1.hp.com/support/files/index.html).

Change control and proactive notification

HP offers Change Control and Proactive Notification to notify customers 30 to 60 days in advance of upcoming hardware and software changes on HP commercial products.

For more information, refer to the HP website (http://h18023.www1.hp.com/solutions/pcsolutions/pcn.html).

Natural language search assistant

The Natural Language Search Assistant (http://askq.compaq.com) is a search engine that finds information on HP products, including ProLiant servers. The search engine responds to queries entered in question form.

Care Pack

HP Care Pack Services offer upgraded service levels to extend and expand standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your server investments. Refer to the Care Pack website (http://www.hp.com/hps/carepack/servers/cp_proliant.html).

Troubleshooting

In this section

Troubleshooting resources

> **NOTE:** For common troubleshooting procedures, the term "server" is used to mean servers and server blades.

The *HP ProLiant Servers Troubleshooting Guide* provides simple procedures for resolving common problems as well as a comprehensive course of action for fault isolation and identification, error message interpretation, issue resolution, and software maintenance.

To obtain the guide, refer to any of the following sources and then select the *HP ProLiant Servers Troubleshooting Guide.*

- The server-specific Documentation CD

- The Business Support Center on the HP website (http://www.hp.com/support). You can find the guide by using the navigation features on the HP website.

- The Technical Documentation website (http://www.docs.hp.com). Select **Enterprise Servers, Workstations and Systems Hardware,** and then the appropriate server.

Server diagnostic steps

This section covers the steps to take in order to diagnose a problem quickly.

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start diagnosis flowchart (on page 86)," and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in "General diagnosis flowchart (on page 89)." The general diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.

> **IMPORTANT:** This guide provides information for multiple servers. Some information may not apply to the server you are troubleshooting. Refer to the server documentation for information on procedures, hardware options, software tools, and operating systems supported by the server.

> ⚠ **WARNING: To avoid potential problems, ALWAYS read the warnings and cautionary information in the server documentation before removing, replacing, reseating, or modifying system components.**

Important safety information

Familiarize yourself with the safety information in the following sections before troubleshooting the server.

⚠ Important safety information

Before servicing this product, read the *Important Safety Information* document provided with the server.

Symbols on equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.

This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

16.33 kg

36 lb

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

Warnings and cautions

WARNING: Only authorized technicians trained by HP should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- **The leveling feet are extended to the floor.**

- **The full weight of the rack rests on the leveling feet.**

- **The stabilizing feet are attached to the rack if it is a single-rack installation.**

- **The racks are coupled together in multiple-rack installations.**

- **Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.**

WARNING: To reduce the risk of electric shock or damage to the equipment:

- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**

- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**

- **Unplug the power cord from the power supply to disconnect power to the equipment.**

- **Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.**

16.33 kg

36 lb

WARNING: To reduce the risk of personal injury or damage to the equipment:

- **Observe local occupation health and safety requirements and guidelines for manual handling.**

- **Obtain adequate assistance to lift and stabilize the chassis during installation or removal.**

- **The server is unstable when not fastened to the rails.**

- **When mounting the server in a rack, remove the power supplies and any other removable module to reduce the overall weight of the product.**

 CAUTION: To properly ventilate the system, you must provide at least 7.6 cm (3.0 in) of clearance at the front and back of the server.

 CAUTION: The server is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

Preparing the server for diagnosis

1. Be sure the server is in the proper operating environment with adequate power, air conditioning, and humidity control. Refer to the server documentation for required environmental conditions.

2. Record any error messages displayed by the system.

3. Remove all diskettes and CDs from the media drives.

4. Power down the server and peripheral devices if you will be diagnosing the server offline. Always perform an orderly shutdown, if possible. This means you must:

a. Exit any applications.

b. Exit the operating system.

c. Power down the server ("Power down the server blade" on page 22).

5. Disconnect any peripheral devices not required for testing (any devices not necessary to power up the server). Do not disconnect the printer if you want to use it to print error messages.

6. Collect all tools and utilities, such as a Torx screwdriver, loopback adapters, ESD wrist strap, and software utilities, necessary to troubleshoot the problem.

   – You must have the appropriate Health Drivers and Management Agents installed on the server.

     NOTE: To verify the server configuration, connect to the System Management homepage and select **Version Control Agent**. The VCA gives you a list of names and versions of all installed HP drivers, Management Agents, and utilities, and whether they are up to date.

   – HP recommends you have access to the SmartStart CD for value-added software and drivers required during the troubleshooting process.

   – HP recommends you have access to the server documentation for server-specific information.

Symptom information

Before troubleshooting a server problem, collect the following information:

- What events preceded the failure? After which steps does the problem occur?

- What has been changed between the time the server was working and now?

- Did you recently add or remove hardware or software? If so, did you remember to change the appropriate settings in the server setup utility, if necessary?

- Has the server exhibited problem symptoms for a period of time?

- If the problem occurs randomly, what is the duration or frequency?

To answer these questions, the following information may be useful:

- Run HP Insight Diagnostics (on page 72) and use the survey page to view the current configuration or to compare it to previous configurations.

- Refer to your hardware and software records for information.

Service notifications

To view the latest service notifications, refer to the HP website (http://www.hp.com/go/bizsupport). Select the appropriate server model, and then click the **Troubleshoot a Problem** link on the product page.

Loose connections

Action:

- Be sure all power cords are securely connected.

- Be sure all cables are properly aligned and securely connected for all external and internal components.

- Remove and check all data and power cables for damage. Be sure no cables have bent pins or damaged connectors.

- If a fixed cable tray is available for the server, be sure the cords and cables connected to the server are correctly routed through the tray.

- Be sure each device is properly seated.

- If a device has latches, be sure they are completely closed and locked.

- Check any interlock or interconnect LEDs that may indicate a component is not connected properly.

- If problems continue to occur, remove and reinstall each device, checking the connectors and sockets for bent pins or other damage.

Diagnostic steps

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start diagnosis flowchart (on page 86)," and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in "General diagnosis flowchart (on page 89)." The general diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.

The available flowcharts include:

- Start diagnosis flowchart (on page 86)

- General diagnosis flowchart (on page 89)

- Power-on problems flowchart ("Server blade power-on problems flowchart" on page 91)

- POST problems flowchart (on page 93)

- OS boot problems flowchart (on page 95)

- Server fault indications flowchart (on page 98)

The number contained in parentheses in the flowchart boxes corresponds to a table with references to other detailed documents or troubleshooting instructions.

Start diagnosis flowchart

Use the following flowchart to start the diagnostic process.

Item	Refer to
1	"General diagnosis flowchart (on page 89)"

Item	Refer to
2	"Power-on problems flowchart ("Server blade power-on problems flowchart" on page 91)"
3	"POST problems flowchart (on page 93)"
4	"OS boot problems flowchart (on page 95)"
5	"Server fault indications flowchart (on page 98)"

Start Diagnosis

Do you want to perform the General Diagnosis?

—Yes→ (1) Go to General Diagnosis

No

Does server power on?

—No→ (2) Go to Power On Problems

Yes

Does server complete POST OK?

—No→ (3) Go to POST Problems

Yes

Does server boot to OS OK?

—No→ (4) Go to OS Boot Problems

Yes

Does server have Insight Management Agent fault or LED fault indication?

—Yes→ (5) Go to Server Fault Indications

—No→ (1) Go to General Diagnosis
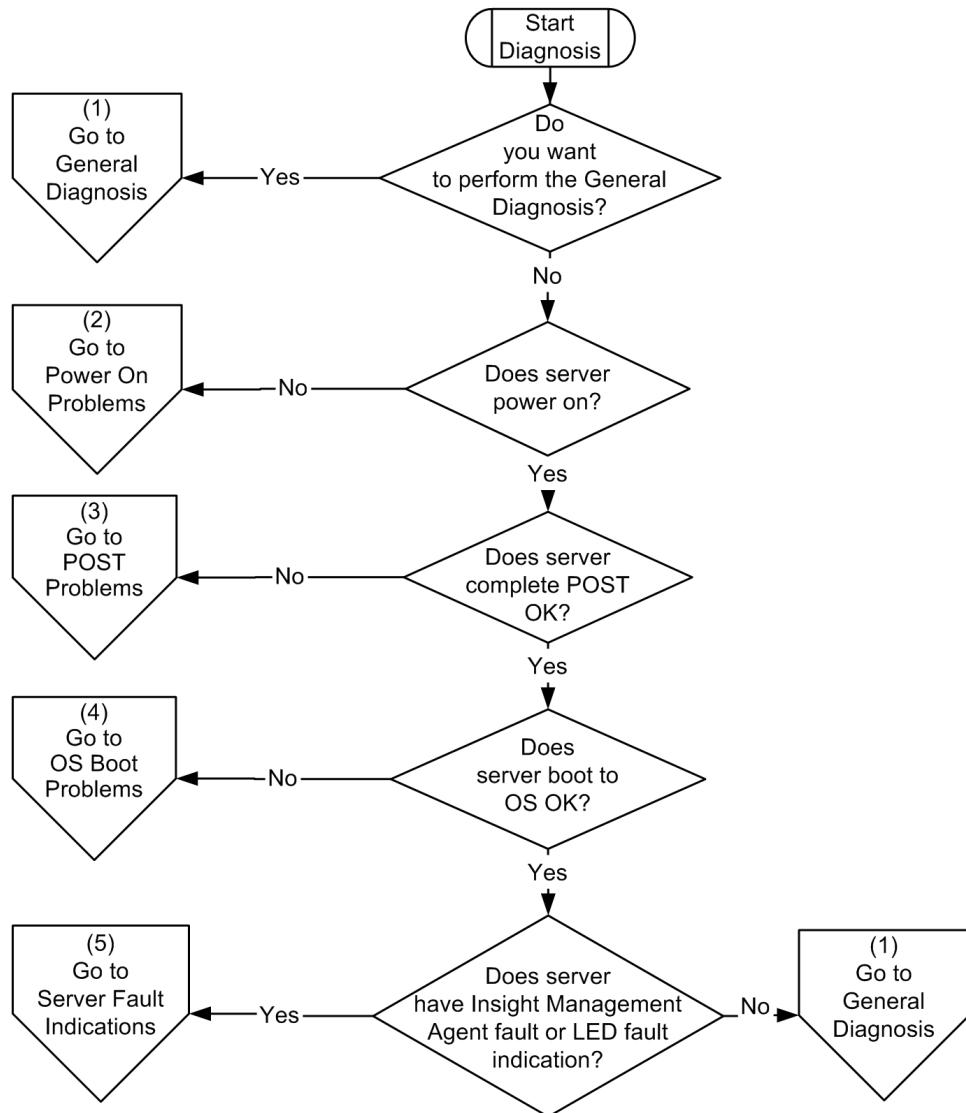
General diagnosis flowchart

The General diagnosis flowchart provides a generic approach to troubleshooting. If you are unsure of the problem, or if the other flowcharts do not fix the problem, use the following flowchart.

Item	Refer to
1	"Symptom information (on page 84)"
2	"Loose connections (on page 85)"
3	"Service notifications (on page 85)"
4	Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
5	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
6	• Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info) • "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
7	• "Server information you need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Operating system information you need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
8	"Contacting HP technical support or an authorized reseller" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).

Start General Diagnosis

(1)
Record symptom information.

Reboot server to see if condition still exists.

(2)
Reseat any components that may have come loose during shipping and reboot the server.

Does condition still exist?

Yes → No

Is this a newly installed server?

Yes

No

Were options added or was the configuration changed recently?

No →

(3)
Check for Service Notifications.

Does condition still exist?

No

Yes

Yes

Download the latest software and firmware from the HP website.

(4)
Isolate what has changed. Verify it was installed correctly. Restore server to last known working state or original shipped configuration.

Does condition still exist?

No

(6)
Troubleshoot or replace basic server spare parts.

Yes

Does condition still exist?

(5)
Break server down to minimal configuration.

Yes

Does condition still exist?

No

No

Does condition still exist?

No

Yes

No

(4)
Add one part at a time back to configuration to isolate faulty component.

Does condition still exist?

No

Yes

Does condition still exist?

No

(1)
Record action taken.

Yes

Record symptom & error information on repair tag if sending back a failed part.

(7)
Ensure the following information is available:
• Survey configuration snapshots
• OS event log file
• Full crash dump

(8)
Call HP Service Provider

End

Server blade power-on problems flowchart

Symptoms:

- The server does not power on.

- The power on/standby LED is off or amber.

- The health LED is red or amber.

> **NOTE:** For the location of server LEDs and information on their statuses, refer to the server documentation.

Possible causes:

- Improperly seated or faulty power supply

- Loose or faulty power cord

- Power source problem

- Power on circuit problem

- Improperly seated component or interlock problem

- Faulty internal component

Item	Refer to
1	Server user guide or setup and installation guide, located on the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info).
2	"General diagnosis flowchart (on page 89)"
3	"Loose connections (on page 85)"
4	Power Calculator on the HP website (http://www.hp.com/go/bladesystem/powercalculator).
5	*HP BladeSystem Maintenance and Service Guide* located on the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info).
6	*Integrated Lights-Out User Guide* located on the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info).
7	Server maintenance and service guide, located on the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info).

```
                                                              ┌─────────┐
                                                              │  Start  │
                                                              └────┬────┘
                                                                   ▼
                                                               Does
                                                           the server
                                                           automatically
                                                           power on?        Yes
                                                                   │
                     Switch the power                             No ──────► End
                     enclosure/server blade
                     enclosure to on.

   (5)                   (2)
   Replace or            Go to
   troubleshoot the      General
   BladeSystem           Diagnosis
   infrastructure
   components.

                  (7)           Are the power                (1)
                  Replace or    switches for the             Are any
                  troubleshoot  power enclosure and   Yes     server blade front panel
                  the server    bus bars on?        ◄────    LEDs
                  internal                            No     illuminated?
                  components.                                      │
                                                                 Yes
   (4)              Are server                               (3)
   Verify that      blade and power                          Check for loose
   sufficient       management fault    No                   connections or
   power is         LEDs on?        ◄────                     power cords.
   available for
   the server blade.                                         Replace or
                                                             troubleshoot the
   Is sufficient         Yes                                 server internal
   power available       Replace or                          components.
   for the server        troubleshoot the
   blade?                server blade or      Yes            If the condition
                         power                               still exists, is the
   Yes                   management                          "Automatically Power
                         module.                     Yes     On Server" choice
   (7)                                              ◄────    selected in iLO?
   Replace or
   troubleshoot the      Are the
   server internal       management
   components.           modules cabled
                         properly?
   (5)
   Replace or troubleshoot
   the BladeSystem
   infrastructure
   components.

   (2)           (7)          (5)                (6)
   Go to         Add more     Cable all          Change the setting in
   General       power        management         iLO and reinsert the
   Diagnosis     supplies or  modules properly.  server blade.
                 power
                 enclosures.
```

POST problems flowchart

Symptoms:

- Server does not complete POST

    NOTE: The server has completed POST when the system attempts to access the boot device.

- Server completes POST with errors

Possible Problems:

- Improperly seated or faulty internal component
- Faulty KVM device
- Faulty video device

Item	Refer to
1	"POST error messages ("POST error messages and beep codes" on page 101)" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
2	"Video problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	KVM or RILOE documentation
4	"Loose connections (on page 85)"
5	Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
6	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
7	• "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)

```
                                                                    ┌─── Yes ──────────────────────┐
  ╭──────────────╮                                                  │                              │
  │ Start POST   │                              ┌──────────┐        │                              │
  │ Problems     │                      ┌─ No ─►│   Is     │        │                              │
  ╰──────┬───────╯                      │       │ RILOE    │     ┌──────────────┐                  │
         │                              │       │ board    ├─ No ►│  (2)         │                  │
         ▼                              │       │ installed│     │ Verify video │                  │
   ◇──────────◇         ◇──────────◇    │       │   ?      │     │ is cabled    │                  │
  │  Have video │─ No ─►│ Are the fans│─┘       └────┬─────┘     │ correctly.   │                  │
  │  output?    │       │  on?        │──┐           │           └──────┬───────┘                  │
   ◇─────┬────◇         ◇──────┬────◇   │         No │                  │                          │
        Yes                   Yes      No           │           ┌──────────────┐                  │
         │                     │        │           ▼           │  (3)         │                  │
         ▼               ◇──────────◇   │     ◇──────────◇      │ Verify the   │                  │
  ◇───────────◇         │ Are there   │  │    │    Do      │◄────┤ KVM is       │                  │
 │   POST      │        │ any beep    │  │    │ you have    │     │ cabled to    │                  │
 │   errors    ├────────┤ codes?      │  │    │ known good  ├─ No►│ RILOE board. │                  │
 │  messages   │         ◇──────┬────◇   │    │ KVM?        │     └──────────────┘                  │
 │  displayed  │               Yes      No    ◇─────┬────◇      ┌──────────────┐                  │
 │   ?         │                │        │        Yes           │ Test RILOE   │                  │
  ◇─────┬────◇                  │        │          │           │ board or     │                  │
       Yes                      │        │          ▼           │ replace KVM  │                  │
         └──────────┐           │        │     ◇──────────◇      │ component.   │                  │
                    ▼           │        │    │ Is internal│     └──────────────┘                  │
            ┌──────────────┐    │        │    │ health LED ├─ Yes►┌──────────────┐                  │
            │  (1)         │◄───┘        │    │ amber or   │      │ (4)          │                  │
            │ Refer to     │             │    │ red?       │      │ Reseat       │                  │
            │ "Post Error  │             │     ◇────┬─────◇       │ indicated    │                  │
            │ Messages"    │             │          │            │ component.   │                  │
            │ section.     │             │          │            │ Check for    │                  │
            └──────┬───────┘             │          │            │ loose        │                  │
                   │                     │          │            │ connections. │                  │
                   │──────── No ─────────┘          │            └──────┬───────┘                  │
                   ▼                                │            ┌──────────────┐                  │
          ┌──────────────┐   ◇──────────◇          │            │ (5)          │                  │
          │  (6)         │  │   Does     │          │            │ If condition │                  │
          │ Break server │  │ condition  │          │            │ still exists,│                  │
          │ down to the  ├─►│ still      ├─ No ►┌──────────────┐ │ replace      │                  │
          │ minimum      │  │ exist?     │      │ Add one part │ │ indicated    │                  │
          │ configuration│   ◇────┬─────◇       │ at a time    │ │ component.   │                  │
          └──────┬───────┘       Yes           │ back to      │ └──────┬───────┘                  │
                 │                │            │ configuration│        │                          │
                 │────── Yes ─────┘            │ to isolate   │        ▼                          │
                 ▼                             │ component.   │  ◇──────────◇                     │
          ┌──────────────┐   ◇──────────◇      └──────┬───────┘ │   Does     │                     │
          │  (7)         │  │   Does     │            │         │ condition  │                     │
          │ Troubleshoot │  │ condition  ├─ No ►┌──────────────┐│ still      │                     │
          │ or replace   ├─►│ still      │      │ Record       ││ exist?     │                     │
          │ basic server │  │ exist?     │      │ symptom &    │ ◇────┬─────◇                      │
          │ spare parts. │   ◇────┬─────◇       │ error info   │     No                            │
          └──────────────┘       Yes           │ on repair tag│      │                            │
                                  │            │ if sending   │      ▼                            │
                                  │──Yes──┐    │ back a       │ ┌──────────────┐                  │
                                         ▼     │ failed part. │ │ (1)          │                  │
  ╭──────────────╮  ┌──────────────────────┐  └──────────────┘ │ Record       │                  │
  │  (8)         │  │  (7)                 │         Yes        │ action       │                  │
  │ Call HP      │◄─┤ Ensure the following │◄────────┘          │ taken.       │                  │
  │ Service      │  │ information is       │                    └──────┬───────┘                  │
  │ Provider     │  │ available:           │                           ▼                          │
  ╰──────────────╯  │ • Survey config      │                    ╭──────────────╮                 │
                    │   snapshots          │                    │     End      │                 │
                    │ • OS event log file  │                    ╰──────────────╯                 │
                    │ • Full crash dump    │                                                       │
                    └──────────────────────┘                                                       │
```

Start POST Problems

Have video output? — No → Are the fans on? — No → Is RILOE board installed? — Yes

Have video output? — Yes → POST errors messages displayed?

Are the fans on? — No → (loops back)

Are there any beep codes? — No (back to Are the fans on)

Are there any beep codes? — Yes

POST errors messages displayed? — Yes → (1) Refer to "Post Error Messages" section.

Is RILOE board installed? — No → (2) Verify video is cabled correctly.

(2) Verify video is cabled correctly.

(3) Verify the KVM is cabled to RILOE board.

Do you have known good KVM? — No → Test RILOE board or replace KVM component.

Do you have known good KVM? — Yes → Is internal health LED amber or red?

Is internal health LED amber or red? — Yes → (4) Reseat indicated component. Check for loose connections.

Is internal health LED amber or red? — No → (6) Break server down to the minimum configuration.

(4) Reseat indicated component. Check for loose connections.

(5) If condition still exists, replace indicated component.

(6) Break server down to the minimum configuration.

Does condition still exist? — No → Add one part at a time back to configuration to isolate component.

Does condition still exist? — Yes → (7) Troubleshoot or replace basic server spare parts.

(7) Troubleshoot or replace basic server spare parts.

Does condition still exist? — No → Record symptom & error information on repair tag if sending back a failed part.

Does condition still exist? — Yes → (7) Ensure the following information is available:
• Survey configuration snapshots
• OS event log file
• Full crash dump

Does condition still exist? — No → (1) Record action taken. → End

Does condition still exist? — Yes → (7) Ensure the following information is available

(7) Ensure the following information is available → (8) Call HP Service Provider

OS boot problems flowchart

Symptoms:

- Server does not boot a previously installed OS

- Server does not boot SmartStart

Possible Causes:

- Corrupted OS

- Hard drive subsystem problem

Item	Refer to
1	*HP ROM-Based Setup Utility User Guide* (http://www.hp.com/servers/smartstart)
2	"POST problems ("POST problems flowchart" on page 93)" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	• "Hard drive problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Controller documentation
4	"HP Insight Diagnostics (on page 72)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
5	• "Loose connections (on page 85)" • "CD-ROM and DVD drive problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Controller documentation
6	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)

Item	Refer to
7	• "Operating system problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Contacting HP technical support or an authorized reseller" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
8	• "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
9	"General diagnosis flowchart (on page 89)"

Start OS Boot Problems

Does the server boot SmartStart CD? —No→ (1) Disable Fast Boot in RBSU and check server boot order. → Does server still boot with errors? —Yes→ (2) Go to POST Problems

Does server still boot with errors? —No

Does the server boot SmartStart CD? —Yes↓

Does SmartStart recognize boot device? —No→ (3) Troubleshoot possible hard drive subsystem problem.

Does server still fail to boot SmartStart? —No

Does SmartStart recognize boot device? —Yes↓

(4) Run Insight Diagnostics.

Does server still fail to boot SmartStart? —Yes↓

Is this a known good copy of SmartStart? —No→ Still fail with known good copy?

Did Diagnostics run without errors? —No→ Troubleshoot problem found by Diagnostics.

Is this a known good copy of SmartStart? —Yes↓

Still fail with known good copy? —Yes→

(5) Check CD/DVD-ROM, IDE controller and cable.

Did Diagnostics run without errors? —Yes↓

(7) Troubleshoot possible corrupted system disk or OS.

(6) Break server down to minimum configuration. → Does condition still exist?

Add parts back to configuration to isolate component.

Does condition still exist? —Yes→

Does condition still exist? —No

Does condition still exist? (6) —Yes↓

(8) Troubleshoot or replace basic server spare parts.

Does condition still exist? —No→ End

Does condition still exist? —Yes↓

(9) Go to General Diagnosis

End

Server fault indications flowchart

Symptoms:

- Server boots, but a fault event is reported by Insight Management Agents (on page 71)

- Server boots, but the internal health LED or external health LED is red or amber

    NOTE: For the location of server LEDs and information on their statuses, refer to the server documentation.

Possible causes:

- Improperly seated or faulty internal or external component

- Unsupported component installed

- Redundancy failure

- System overtemperature condition

Item	Refer to
1	"Management agents (on page 71)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
2	• "Integrated Management Log (on page 73)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Event list error messages" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
4	System Management Homepage at https://localhost:2381 (https://localhost:2381)
5	"Power-on problems ("Server blade power-on problems flowchart" on page 91)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).

Item	Refer to
6	• "Hard drive problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
7	"HP Insight Diagnostics (on page 72)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
8	• "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)

Start Server Fault Indications

Select an appropriate fault indicator.

(1) Insight Management Agents

(2) IML

(3) LEDs

Was event reported by Insight Management Agents?

Is there an IML entry identifying the problem?

No

No

Is the internal health LED amber?

No

Is the internal health LED red?

No

Is the external health LED red or amber?

Yes

Yes

Yes

The system is degraded.

The system is critical.

(4) Gather information from the System Management Homepage. Failing components will be shown as yellow (degraded) or orange (failed).

Yes

(2) Obtain failure information from IML entry, if available.

No

Are there any component health LEDs illuminated?

Yes

No

(5) Go to Power On Problems

Is there sufficient information to identify failing component?

No

(7) Use maintenance tools to identify the problem.

No

Is a hard drive fault LED on?

Yes

Yes

Yes

(8) Replace or reseat component identified as failed or about to fail.

Yes

(6) Reseat or replace failed hard drive.

Mark the corresponding IML entry as repaired, if present.

End

POST error messages and beep codes

List of messages:

Introduction to POST error messages

The error messages and codes in this section include all messages generated by
ProLiant servers. Some messages are informational only and do not indicate an
error. A server generates only the codes that are applicable to its configuration
and options.

The following POST messages are new. For a complete listing of error messages,
refer to the POST messages in the *HP ProLiant Servers Troubleshooting Guide*
located on the Documentation CD or on the HP website
(http://www.hp.com/support).

⚠ **WARNING: To avoid potential problems, ALWAYS read
the warnings and cautionary information in the server
documentation before removing, replacing, reseating, or modifying
system components.**

Invalid memory types were found on the same node. Please check DIMM compatibility. - Some DIMMs may not be used

Description: Invalid or mixed memory types were detected during POST.

Action: Use only supported DIMM pairs when populating memory sockets. Refer to the applicable server user guide memory requirements.

Fibre Channel Mezzanine/Balcony Not Supported.

Audible Beeps: 2 short

Description: The Fibre Channel adapter is not supported on the server.

Action: Install the supported Fibre Channel adapter.

Memory found on unpopulated Node. — Processor is required to be installed for memory to be used.

Description: The system detects DIMMs, but is unable to use the DIMMs because a processor is not installed in the corresponding socket.

Action: To use the installed DIMMs, install a processor in the corresponding socket.

Mixed processor speeds detected. Please make sure that all processors are the same speed. — System Halted!

Audible Beeps: 1 long, 1 short

Description: Mixed processor speeds are not supported.

Action: Refer to the server blade documentation for supported processors. Be sure that all installed processors are the same speed.

Node Interleaving disabled - Invalid memory configuration

Description: Each node must have the same memory configuration to enable interleaving.

Action: Populate each node with the same memory configuration and enable interleaving in RBSU.

There must be a first DIMM in pair if second DIMM in pair is populated. Second DIMM in pair ignored.

Description: The first DIMM socket in the pair is not populated. The second DIMM in the pair is not recognized or used.

Action: Populate the DIMM socket.

Unsupported DIMM(s) found in system. - DIMM(s) may not be used

Description: Unsupported memory types found in system.

Action: Refer to the applicable server user guide memory requirements and replace with supported DIMMs.

1610-Temperature Violation Detected. - Waiting 5 Minutes for System to Cool

...Press Esc key to resume booting without waiting for the system to cool.

WARNING: Pressing Esc is NOT recommended as the system may shutdown unexpectedly.

Audible Beeps: None

Possible Cause: The ambient system temperature exceeded acceptable levels.

Action: Lower the room temperature.

Regulatory compliance notices

In this section

Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

Federal Communications Commission notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (for example, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

FCC rating label

The FCC rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or ID on the label. Class A devices do not have an FCC logo or ID on the label. After you determine the class of the device, refer to the corresponding statement.

Class A equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.

- Consult the dealer or an experienced radio or television technician for help.

Declaration of conformity for products marked with the FCC logo, United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding this product, contact us by mail or telephone:

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 530113
  Houston, Texas 77269-2000

- 1-800-HP-INVENT (1-800-474-6836). (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 510101
  Houston, Texas 77269-2000

- 1-281-514-3333

To identify this product, refer to the part, series, or model number found on the product.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

European Union regulatory notice

This product complies with the following EU Directives:

- Low Voltage Directive 73/23/EEC

- EMC Directive 89/336/EEC

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) which are listed on the EU Declaration of Conformity issued by Hewlett-Packard for this product or product family.

This compliance is indicated by the following conformity marking placed on the product:

$$C\!\in$$

This marking is valid for non-Telecom products and EU harmonized Telecom products (e.g. Bluetooth).

$$C\!E\,(xxxx*)\,\textcircled{\footnotesize !}$$

This marking is valid for EU non-harmonized Telecom products.

*Notified body number (used only if applicable—refer to the product label)

Canadian notice (Avis Canadien)

Class A equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Japanese notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文を
お読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準
に基づくクラスB情報技術装置です。この装置は、家庭環境で使用すること
を目的としていますが、この装置がラジオやテレビジョン受信機に近接して
使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に
基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るよう要求されることがあります。

BSMI notice

警告使用者:

這是甲類的資訊產品，在居住的
環境中使用時，可能會造成射頻
干擾，在這種情況下，使用者會
被要求採取某些適當的對策。

Korean notice A&B

Class A equipment

A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니
판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약
잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기
바랍니다.

Class B equipment

B급 기기 (가정용 정보통신기기)

이 기기는 가정용으로 전자파적합등록을 한 기기로서
주거지역에서는 물론 모든지역에서 사용할 수 있습니다.

Battery replacement notice

⚠ **WARNING: The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:**

- **Do not attempt to recharge the battery.**

- **Do not expose the battery to temperatures higher than 60°C (140°F).**

- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**
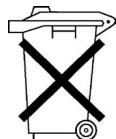
Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP Partner, or their agents.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

Taiwan battery recycling notice

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.

Electrostatic discharge

In this section

Preventing electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.

- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.

- Place parts on a grounded surface before removing them from their containers.

- Avoid touching pins, leads, or circuitry.

- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding methods to prevent electrostatic discharge

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.

- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.

- Use conductive field service tools.

- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.

Specifications

In this section

Environmental specifications

Temperature range*	Specification
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-40°C to 60°C (-40°F to 140°F)
Storage	-20°C to 60°C (-4 to 140°C)
Maximum wet bulb temperature	30°C (86°F)
Relative humidity (noncondensing)**	**Specification**
Operating	10% to 90%
Shipping	10% to 90%
Storage	10% to 95%

* All temperature ratings shown are for sea level. An altitude derating of 1°C per 304.8 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. Upper operating limit is 3,048m (10,000 ft) or 70 Kpa/10.1 psia. Upper non-operating limit is 9,144 m (30,000 ft) or 30.3 KPa/4.4 psia.

** Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.

Server specifications

Dimensions	Specifications
Height	8.699 cm (3.425 in)

Depth	71.1 cm (28.00 in)
Width	26.14 cm (10.29 in)
Weight (maximum)	16.33 kg (36 lb)

Technical support

In this section

Before you contact HP

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)

- Product serial number

- Product model name and number

- Applicable error messages

- Add-on boards or hardware

- Third-party hardware or software

- Operating system type and revision level

HP contact information

For the name of the nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.

- In Canada, call 1-800-263-5868.

- In other locations, refer to the HP website (http://www.hp.com).

For HP technical support:

- In North America:

– Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

– If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website (http://www.hp.com).

- Outside North America, call the nearest HP Technical Support Phone Center. For telephone numbers for worldwide Technical Support Centers, refer to the HP website (http://www.hp.com).

Customer self repair

What is customer self repair?

HP's customer self-repair program offers you the fastest service under either warranty or contract. It enables HP to ship replacement parts directly to you so that you can replace them. Using this program, you can replace parts at your own convenience.

A convenient, easy-to-use program:

- An HP support specialist will diagnose and assess whether a replacement part is required to address a system problem. The specialist will also determine whether you can replace the part.

- For specific information about customer replaceable parts, refer to the maintenance and service guide on the HP website (http://www.hp.com/support).

Acronyms and abbreviations

ABEND

abnormal end

ACU

Array Configuration Utility

ADG

Advanced Data Guarding (also known as RAID 6)

ASR

Automatic Server Recovery

BBWC

battery-backed write cache

BIOS

Basic Input/Output System

DDR

double data rate

DHCP

Dynamic Host Configuration Protocol

DNS

domain name system

ESD

electrostatic discharge

FC

Fibre Channel

FCA

Fibre Channel Adapter

I/O

input/output

IEC

International Electrotechnical Commission

iLO

Integrated Lights-Out

IML

Integrated Management Log

IP

Internet Protocol

ISEE

Instant Support Enterprise Edition

KVM

keyboard, video, and mouse

LED

light-emitting diode

NBP

Network Bootstrap Program

NEMA

National Electrical Manufacturers Association

NFPA

National Fire Protection Association

NFS

network file system

NIC

network interface controller

ORCA

Option ROM Configuration for Arrays

OSEM

Open Services Event Manager

POST

Power-On Self Test

PSP

ProLiant Support Pack

PXE

preboot eXecution environment

RAID

redundant array of inexpensive (or independent) disks

RBSU

ROM-Based Setup Utility

RDP

Rapid Deployment Pack

RILOE

Remote Insight Lights-Out Edition

ROM

read-only memory

SA

Smart Array

SAN

Storage Area Network

SCSI

small computer system interface

SFP

small form-factor pluggable

SIM

Systems Insight Manager

SNMP

Simple Network Management Protocol

TCP/IP

Transmission Control Protocol/Internet Protocol

TFTP

Trivial File Transfer Protocol

TMRA

recommended ambient operating temperature

UID

unit identification

UPS

uninterruptible power system

USB

universal serial bus

VCA

version control agent

WEBES

Web-Based Enterprise Service

WfM

Wired for Management

WINS

Windows® Internet Naming Service

Index

V

W